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OIL SWITCHES AND CIRCUIT BREAKERS.
BY FORD W. HARRIS.

A PIONEER TELEGRAPH LINE.
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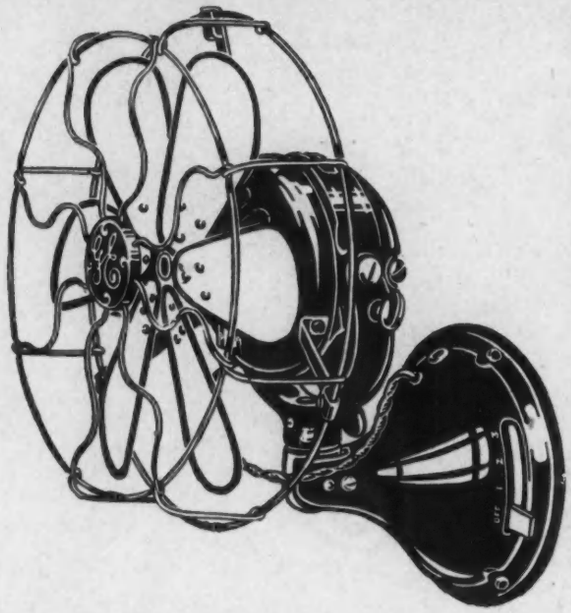

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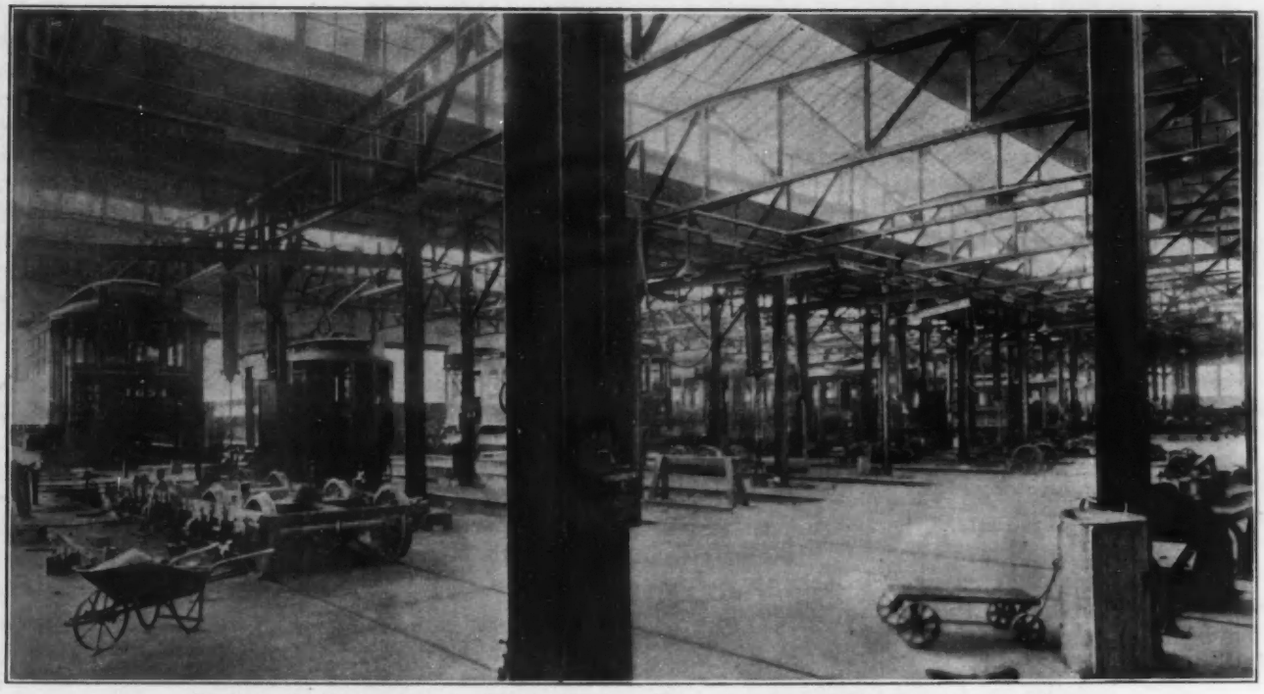
PORTLAND FIRE ALARM SYSTEM

BY R. P. ROGERS.

(A description of an elastic system of wide application and use, for transmitting fire alarms over telephone circuits. The fire-fighting appliances and the application of this alarm system to car shops of the Portland Railway, Light & Power Company, installation and operation in general, are also detailed.—The Editors.)



Portion of Center Street (Portland) Car Shops Equipped With Auto Alarm System.

The manual telephone fire alarm system of Portland, Oregon, operates over the Home Telephone Company's lines—an automatic telephone system.

It is the Denio system and consists of a fire alarm box connected to the telephone circuit between the telephone and the central exchange, and may be placed upon the street and in the residence, store, factory, church, theatre or school. Direct automatic connection is made to fire headquarters where the fire notification is registered, thus giving direct communication to the fire department, where the alarm is recorded on an approved punch register, within a few seconds.

Installations of this system may be so arranged in hotels, factories or stores, that every guest or employe receives immediate notification of a fire, thus affording ample opportunity both for the saving of life and property.

All troubles—such as grounds, open battery, etc., come in automatically as "trouble alarms" to the central office of the company.

In the fire limits all of the wires of the system are underground and two geographical routes, from the telephone central office and the fire alarm company's central office to the fire headquarters are provided, one being over the Pacific Telephone & Telegraph Company's lines and the other over the Home Telephone & Telegraph Company's line. Either route is selected by the apparatus automatically.

Inside of all buildings the wiring in connection with this system is installed in approved iron conduit. All circuit wires are No. 16 r.c. copper wire.

This system can be operated over manual or magneto telephone systems as well as over an automatic system, without interference with switchboard or telephone service, the only requisite being a working telephone.

The use of telephone lines for transmitting fire alarms in the past has not been looked upon as wholly satisfactory. In the past ten years the telephone has created new conditions and these new conditions call for new provisions and regulations.

It must be conceded that if the telephone is to be used for transmitting fire calls, some accurate method should be employed. The use of a telephone circuit makes possible the individual fire alarm station in every home, store or factory and in the event of a fire will be the means of saving much property by securing prompt assistance.

In trying to telephone an alarm numberless instances could be cited where it was impossible to learn the location on account of the excitement of the person trying to report it, yet reliable statistics covering a number of years show that in the United States more fire alarms are transmitted by telephone than in any other way.

Fire protection is one of the most important problems of the hour, and of concern to every individual. For every two dollars spent on the construction of new buildings in the United States, one dollar's worth of property goes up in flame and smoke, absolutely wiped out and a total loss forever. Notwithstanding the marked improvements for fighting fires, the losses are constantly on the increase, besides a great loss of life.

It is very easy to put out a fire in its incipiency, therefore, the value of immediate notification to fire department headquarters. The first five minutes of any fire are the most important and are worth the next hour.

How few people know the location of the nearest municipal fire alarm box. But if the system is installed in their property they are constantly reminded of the boxes by daily contact.

The system has been in operation several years, and has fully demonstrated its practicability and has received the approval of the leading telephone engineers of the United States and also the National Board of Fire Underwriters.

Systems installed to date are as follows:

Rochester, N. Y. (Manual Telephone System.)
Alpena, Mich. (Manual Telephone System).
Honolulu, (Automatic Telephone System).
South Bend, Ind. (Automatic Telephone System).
San Diego, Cal. (Automatic Telephone System).
Los Angeles, Cal., (Automatic Telephone System).

This description relates to the Denio Fire Alarm System operating over an automatic telephone line.

Residence or Single Box Installations.

The single box consists of a clock movement operated by a push button arrangement. The first movement of the box cuts off the telephone and bridges a polarized relay across the line to take care of any in-coming call. The second movement grounds both sides of the telephone line preparatory to a full release of switches (automatic telephones).

In case of an in-coming call landing on this particular line switch at the same time the button is being pushed or between the time of pushing the button and the building up of the connection to fire headquarters, the polarized relay arrests the movement of the box and the calling party getting no reply, hangs up and repeats his call. The instant he hangs up, he releases the polarized relay, setting the box in motion, which, in turn, takes full possession of the line before he has time to land on this particular switch, the second time. This precludes all chance of interference from either end of the line and makes the operation of the box absolutely positive.

The calling device consists of a trunk character wheel which connects with a level equipped for ten repeaters. This level is connected directly to registers located in the fire headquarters and the central office of the fire alarm company.

No. 1 repeater connects directly with No. 1 register; No. 2 repeater with No. 2 register and so on and in case of two alarms coming in at the same time, the first to land on the repeater level would take No. 1 repeater, and the second would automatically pass over No. 1 and select No. 2 repeater. This level fully equipped with 10 repeaters, would, therefore, be able to take care of 10 alarms sent in—one on top of the other just as fast as one could push the button.

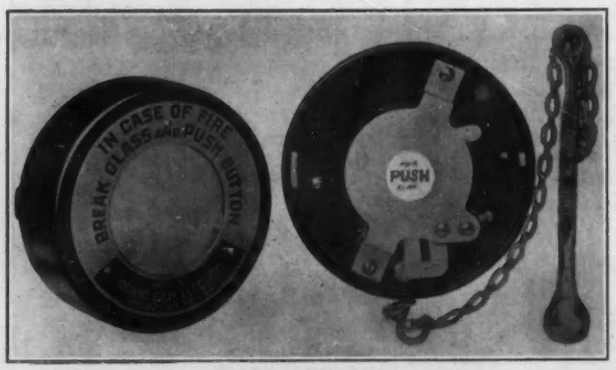
The instant the box connects with the repeater, the box number character wheel is cut into service and transmits and records this particular box number on the tape at fire headquarters and at the central office of the Fire Alarm Company. After this number has been recorded on the tape eight consecutive times, the box automatically releases the call and restores the telephone line to service and the telephone is now ready to either receive or transmit messages, etc.

These trunk lines from repeater to fire headquarters and the central office of the Fire Alarm Company are, normally, on closed circuit. (See route of fire alarm and trouble transmission circuits), and are under constant test for opens, grounds and shorts and besides this are tested twice daily from the central office of the Fire Alarm Company.

Factory Installation.

Factory installations comprise a more elaborate scheme and the equipment consists of the following:

Fire alarm transmitter or master box.
Trouble alarm transmitter:
Local batteries, circuit relays.
Test relays, gongs for warning occupants of building.
Fire and trouble bells to serve as local warning of trouble.
Annunciator for locating fire.



A Factory Manual Box.

Fire Alarm System in Car Shops.

The prime object of installing a fire alarm system at the Center street car shops of the Portland Railway, Light & Power Company, was to provide a means by which the private fire brigade composed of men employed in the various departments of the shops, could be called together for the purpose of holding fire drills at regular intervals and receive instruction in fire prevention and fire fighting. As the distance from some of the departments to the nearest city fire alarm box would necessarily be considerable, it was thought advisable to employ a system by which the city fire department might be called from any one of the departments or buildings. It was decided that the Denio system with the addition of local alarms and a device for operating these for fire drill purposes without calling the city department, was suited to fulfill all the requirements.

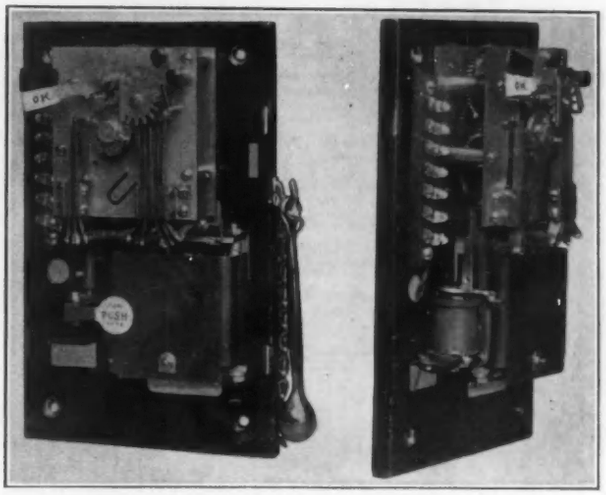
The fire fighting apparatus at the Center street shops in addition to the standard automatic sprinkler systems which are installed throughout, consists of 8 standard fire hydrants fed from a special 8 in. main connected with the city water system, also with a 50,000 gal. gravity tank on a 75 ft. steel tower. A hand hose cart carrying 800 ft. of 2½ in. cotton rubber lined hose and necessary fittings is housed about the center of the group of buildings. Throughout the interior of the several buildings are located single 2 in. hose outlets with a 50 ft. length of 2 in. hose attached to each and so arranged that any point within any one of the buildings may be reached by at least one of these outlets. The fire alarm installation covers the three present buildings which form the shops, all of which are one story high and have a combined floor area of approximately 150,000 sq. ft. The system will later be extended to cover the warehouse, now in course of construction which has a floor area of approximately 50,000 sq. ft. Future structures at this location will also be covered by this same system.

The local alarm system consists of eleven large single stroke electro-mechanical gongs, and twenty-three fire alarm push buttons or stations of the break glass type distributed throughout the various departments of the shops.

Each building has a separate gong circuit and push button circuit with the exception of the general truck and repair shop in which there are two gongs and two push button circuits. This arrangement makes it possible to ring an alarm in any one of the buildings without operating the alarms in the other departments.

At the office of the captain of the employes fire brigade there is a set of drill alarm switches by which the alarm gongs in any one or all of the buildings may be simultaneously operated, calling the fire brigade to any building or section. This set of switches is contained in a small cabinet and is used for drill purposes only.

If any one of the push buttons is operated which would be the case if an actual fire occurred, an alarm is sent in to the central office of the city fire department, indicating there on a tape and by means of a bell, the fact that the alarm has been turned in from this risk. In addition to calling the city department, a local fire alarm box is set in motion which rings the local alarm bells throughout all the buildings, striking a number which indicates the building from which the alarm was turned in, thus calling the local fire brigade to the exact point of the fire. After the push button is operated by the party discovering the fire, the operation of turning in the alarm is entirely automatic and is accomplished as follows—by pressing any one of the fire alarm push buttons, a device



Details of Residence (left) and Factory (right) Fire Alarm Transmitters for Automatic Telephone System.

called the "main fire alarm box" is set in operation. This box is connected with a main line of the automatic telephone and when operating, first takes possession of the telephone line, cutting off the telephone connects itself directly with the city fire department and turns in the alarm as stated above. This operation also sets in motion the local fire alarm box, giving the location of the fire as described.

The wiring for this entire system is in accordance with the requirements of the National Board of Fire Underwriters and little trouble is expected from this source. It is wired on a double loop system so that any circuit may be broken at any one place and still be in operating condition. Any trouble, however, such as a break or grounded circuit is detected by suitable relays cut in on each circuit and connected with a telephone trouble alarm, which, when set in operation, notifies the local office of the Fire Alarm Company of the presence of trouble in a manner similar to that in which the fire alarm box notifies the city fire department. Electrical energy for the operation of this system is obtained from a duplicate set of storage batteries of twelve cells each, so arranged that one battery is charging while the other is supplying current to the system. This battery also operates the time and the recording clocks throughout the shops and is of sufficient size to carry any additional equipment that may be added.

Recording Clocks.

The watchman places a key in this apparatus as he makes his rounds of inspection and the exact time is recorded by a Standard Time Company's station-

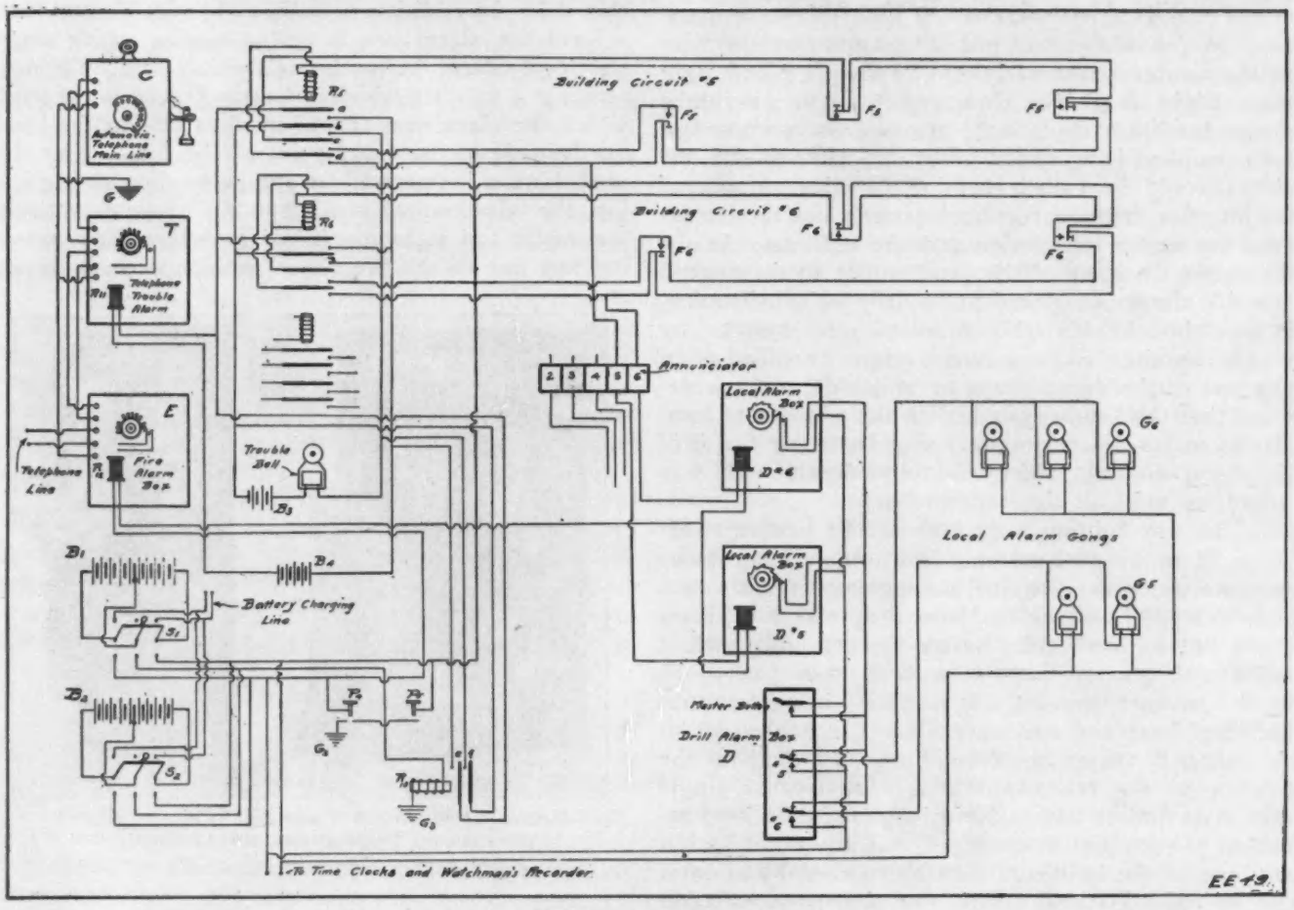


Fig. 1.

ary recorder and an Eco Magneto Clock Company's magneto, thus keeping a check on the operations of the watchman.

All the time clocks in the shops are also synchronized by this master clock.

Operation in Detail.

The operation in detail can best be explained by describing this installation at the shops of the Portland Railway, Light & Power Company, Portland, Oregon.

The system is under constant test and is arranged to sound a fire alarm in every building in the group simultaneously with the calling of the city fire department and it automatically designates the exact building by signalling on the electro mechanical single stroke gongs, the number assigned to that particular building or section of building.

In this diagram only two building circuits are shown. Each building has a separate circuit with the exception of the general truck and repair shop, which is divided into two circuits so that, in case of a fire drill, only the gongs in one building need be sounded at a time and, in case of an actual fire, the building or section in which the fire originated, is indicated.

The equipment as shown on the diagram (Fig. 1), consists of fire alarm box "E," trouble alarm box "T," main line automatic telephone "C," local alarm box D5 and D6, fire drill box "D," annunciator relays R5 and R6 and R10, the above apparatus being located at a central point. The factory manual box push buttons are stations F5 and F6, and the local alarm gongs G5 and G6 are distributed about the several buildings.

Relays R5 and R6 and R10 are of 200 ohms resistance. Relays R11 and 12, the coils of the local alarm boxes D5 and D6 and the annunciator coils are of three ohms resistance each. The local trouble buzzer is also of three ohms resistance. In case of fire the operation would be as follows:

If one of the push buttons F6 be operated, the relay R6 would be shunted and the full strength of the battery B1 or B2, as the case might be, would flow in that circuit.

This would result as follows: Currents from the battery would flow through the relay R12 of the fire alarm box, through the coil of the local alarm box B6, through drop No. 6 of the annunciator to the outside wire of building circuit No. 6, through the push button F6 operated to the other side of the circuit No. 6 thence to battery. By operation of relay R12, the movement of the fire alarm "box E" is set in operation.

The first operation of this box cuts off the trouble alarm "T" and the telephone "C" and bridges the polarized relay across the line to take care of any in-coming call as explained in the preceding part of this article, the mechanical operation of an electrically operated box being exactly the same as one operated manually and it is only 15 sec. from the time the button is pushed to the time the register begins to reel off the notice of fire in fire headquarters and the Fire Alarm Company's central office (Fig. 2) indicating

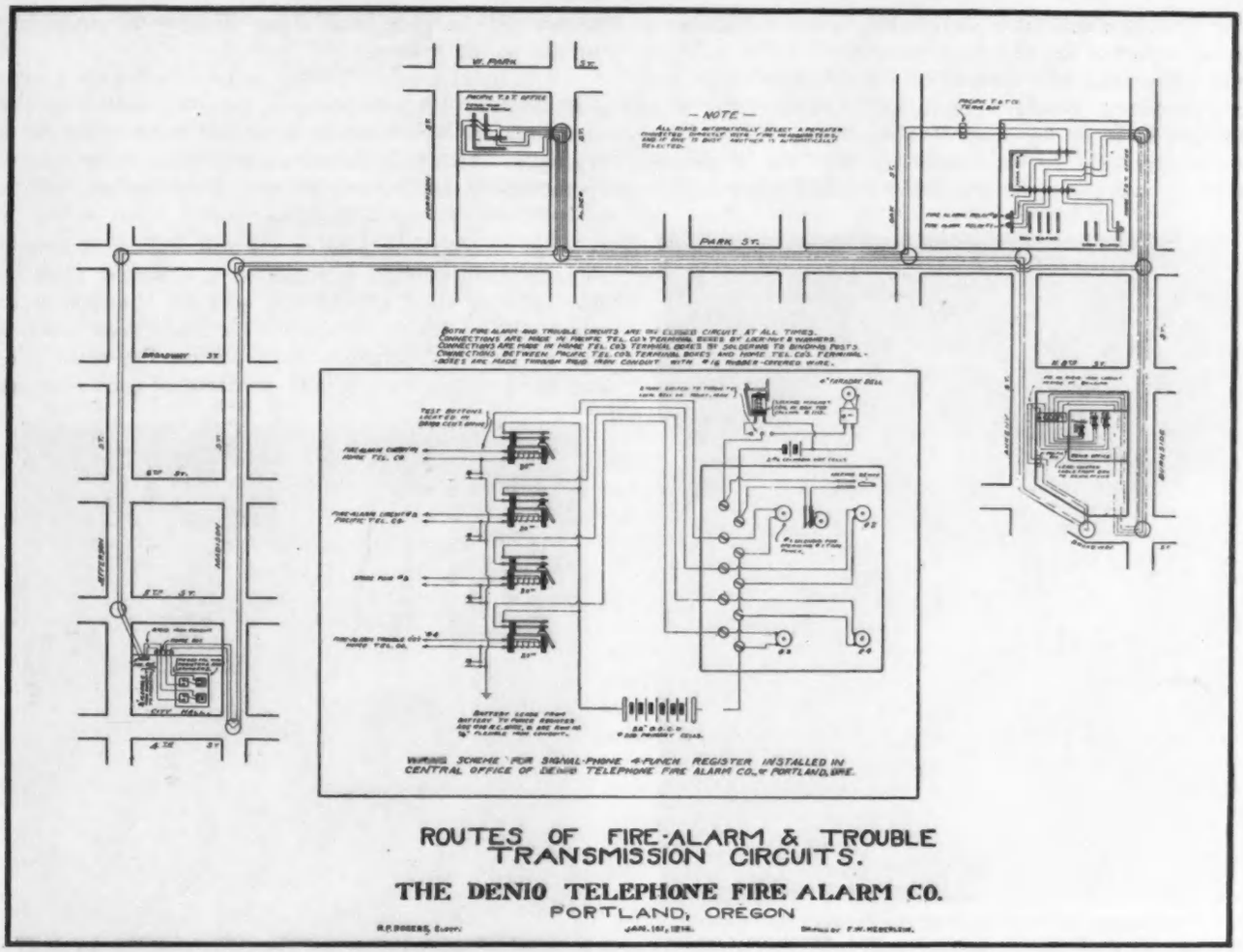

W. PARK ST.
PARK ST.
BROADWAY ST.
— NOTE —
WIRING SCHEME FOR SIGNAL-PHONE 4-PUNCH REGISTER INSTALLED IN CENTRAL OFFICE OF DENIO TELEPHONE FIRE ALARM CO., OF PORTLAND, ORE.
ROUTES OF FIRE-ALARM & TROUBLE TRANSMISSION CIRCUITS.
THE DENIO TELEPHONE FIRE ALARM CO.
PORTLAND, OREGON

Fig. 2.

that a fire has occurred at the shops of the Portland Railway, Light & Power Company.

The local alarm box has a character wheel which sounds the local alarm gongs throughout the several buildings, giving the building number from which the alarm was turned in.

Fire Drill Feature.

If it is desired to hold a drill in any particular building, take building No. 5 for instance: Key 5 in the drill alarm box "D" is operated five times calling the occupants of building No. 5 alone, to a fire drill without disturbing any of the other buildings. If a general drill is desired, the master key in the drill alarm box "D" is pressed a number of times corresponding to the building in which it is desired the drill be held. This fire drill feature and high efficiency should make this an ideal protector for schools, colleges, etc., both public and private, and, in case of actual fire, since the pupils and teachers would be accustomed to the use of this fire drill feature, they would have no means of knowing whether it was an actual fire or a fire drill and, therefore, there would naturally be little or no confusion.

Trouble Feature.

In case of any trouble on the system, such as the grounding of a building circuit, a broken wire or a run-down battery, the telephone trouble alarm "T" is set in operation notifying the central office of the Fire Alarm Company of the fact that trouble exists on the system. The telephone trouble alarm "T" is of exactly the same construction as the fire alarm box "E" with the exception that the character wheel controlling the automatic telephone line is cut to select a level connected with "trouble" registers located in the central office of the Denio Telephone Fire Alarm Company only.

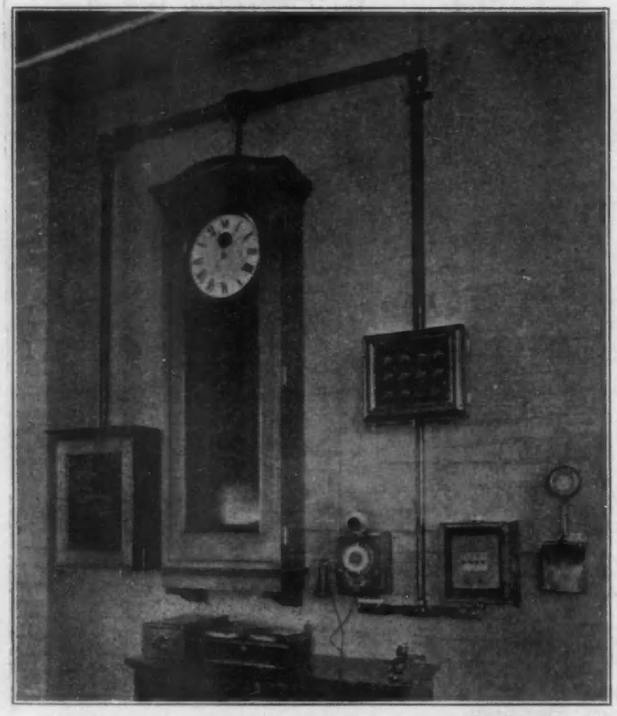
Operation of Trouble Alarm.

Normally the circuit is closed and relays R5 and R6 hold their armatures attracted. The flow of current in these circuits being very light, the low wound coils R11, R12, D5 and D6 and the coils of the annunciator in the circuit are not energized. Should a break occur on either side of the circuit, circuit No. 5 for instance, relay R5 would be energized, closing contacts A, B, C and D, contact "A" closing the circuit of the trouble alarm relay R11, contact "C" closing the local trouble buzzer and bell circuit on a separate battery B3 and contacts "C and D" closing to form a loop enabling an alarm to be sent in from either side of the break. The action of a break in any circuit would be the same.

When trouble alarm relay R11 is operated the movement is released thereby performing the operation of calling the trouble department of the Denio Telephone Fire Alarm Company and recording the box number on the trouble register tape.

Upon completion of the operation of the trouble alarm box "T," the telephone "C" is automatically restored to working order.

Should a fire take place while a trouble alarm is being reported in, the fire alarm box "E" would immediately take full control of the telephone line and switches and would automatically release the connection built up by trouble alarm box "T" and immediately build up its connection with the level connecting with the registers in fire headquarters.



Equipment in the Office of the Center Street Car Shops Showing Recording and Synchronizing Clock, Magnets, Fire Drill and Call Switches, and Annunciator Locating Fire Alarms.

In this particular case we start out with a trouble alarm to the central office The trouble alarm will take 15 sec. to connect with the register in the central office and 2½ seconds to record two rounds on the trouble tape and is then cut off and disconnected automatically by the master box "E." In 15 sec. time the master or fire alarm box "E" has completed its connection and in 2½ sec. placed a verified record of fire on the fire alarm registers in fire headquarters and the central office of the Fire Alarm Company and it is all done in 35 seconds or 5 seconds less time than is required to make a connection and get an answer over a manual telephone (this is taken from telephone statistics and the average time taken to make connection and start talking with public institutions is given as 110 sec., the average time taken to make connection and get the answer from private residences and business phones is given as 40 sec.)

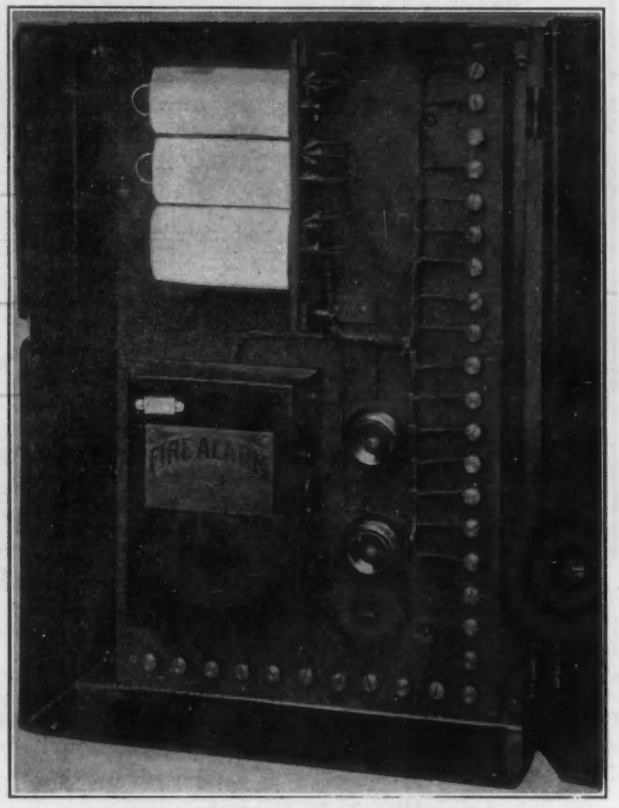
In case of a ground occurring on one of the building circuits relay R10 being grounded at G3, and of 200 ohms resistance, would become energized, closing contact "E" and "F" giving local trouble alarm on the trouble buzzer and operating the telephone trouble alarm "T" sending trouble alarm to the trouble department.

For the operation of this system, two duplicate storage batteries of 12 cells each are employed, connected as shown at B1 and B2, through the double throw switches S1 and S2 so arranged that while one battery is charging, the other battery is supplying current to the system.

The local trouble buzzer is provided with a separate battery B3 consisting of two dry cells and the trouble alarm "T" has a separate battery B4 of 4 dry cells. All of the batteries are tested daily by the operation of test button P4 and P5 described below.

Testing.

For testing one side of P4 and P 5 is grounded at G2. This ground is made at a different location than at G3, then should the ground connection of relay R10 be broken it would be discovered when a test is made. Operating push button P4, tests one-half of the main battery and contacts of ground relay



Factory Panel Equipment.

R10. Operating push button P5 tests the other half of main battery and also relay R10 and batteries B3 and B4. Operating P4 and P5 together shunts the bettery de-energizing relays R 5 and R6, thereby testing relay contacts and trouble alarm signals.

In addition to the above tests, the alarm company is required to have an inspector inspect all risks, once each month, testing for grounds, opens, etc., and both sides of each and every circuit is opened to see that the relay R11 controlling the trouble box "T" will act on an open circuit.

Both sides of each circuit are also grounded to test all contacts and see that each part of the system is in readiness to perform its functions.

This system has been in operation in the city of Portland, Oregon, for one year and in that time has received over its lines 14 fire alarms, three trouble alarms, no false alarms and no failures. The system in each risk is inspected and approved by the Underwriters' Equitable Rating Bureau before being accepted by the fire insurance companies.

OIL SWITCHES AND CIRCUIT BREAKERS.

BY FORD W. HARRIS.

[Concluded.]

The easiest way to do this is to consider what happens when the simplest combination operates. Let us take a single-phase line and consider it as being interrupted by the insertion of three resistance steps and a main break. This can be accomplished by a self contained breaker or by four interlocked mechanisms. Suppose that we elect to use the latter. When a short occurs we cut in the first resistance step by opening the breaker that normally short circuits it. We immediately open the second one and then the third, following this by the fourth which finally clears the circuit. There has been a lot of discussion among the interested engineers on the proportioning of the resistance steps but, having in mind the condition that you have at one instant a low resistance arc of a certain amperage and immediately after a voltage tending to start another arc, it would seem reasonable to make your steps such that the product of the amperage flowing just before the resistance is cut in and the voltage across the gap on the next wave, a constant. If individual breakers, or separate tanks are used for the different breaks, a considerable improvement is effected. In fact it is probable that the factor of safety goes up in proportion to the number of breaks. When, however, the breaks take place in the same tank there is little improvement as the gas from one break is liable to interfere with the next.

There exists a mistaken idea that resistance breakers are of value in allowing the current to die down before the circuit is opened. There is no good reason for this as it is better to let the current die down before the resistance is inserted by the use of time element relays and then when you are ready to operate on the short get it open as soon as you can. The principle advantage in the use of successive steps and a resistance shunting them is in limiting the voltage that tends to build up a new arc as the current reaches zero.

This is a positive advantage and by the use of suitably designed mechanism any circuit can be opened by such successive steps. But to be effective the individual arcs must each be in a separate compartment and the resistance must be quite heavy. The complication of a multiplicity of such breakers is too great to be really practical and the cost of a large power station equipped with a number of such units would be prohibitive. It seems reasonable to carry the designs of the more conventional forms to a higher state of perfection before going to so radical a change in principle.

With that in view it will be instructive to consider the various types now on the market. They do not each have all these faults or even a majority of them, but all the faults mentioned are present in some breakers now being sold commercially. These may be classified as follows:

(a) Insufficient volume of oil. (The oil acts not only as a cooling and insulating medium but also as a damping medium reducing the external manifestations of the explosion just as the force of a bullet is greatly dispersed by sand or water. The inertia of a large body of oil is very valuable on this account, and there are many breakers now in successful service on small plants which for this reason, fail miserably when put on large ones.)

(b) Small contacts. (The contacts on an oil breaker are electrodes for heavy arcs and should be so considered in designing them. Oil breaker trouble can be very much reduced by the use of big arcing tips and rugged contact parts.)

(c) Weak tanks. (The pressures inside a tank are considerable as shown by actual gauge measurements. Weakness may be due to two causes, namely the shape and the material and construction of the tanks. Consider the tank as a steam boiler liable to have a pressure of five or 10 lb. per sq. in. applied to it and the inherent weakness of many designs is at once apparent.)

(d) Improper cushioning. (It is most advisable to have inside the tank a large space filled with air in which the gases of an explosion may expand. With the instantaneous generation of a cubic foot of gas the external effects will be materially less if this gas explosion takes place in a chamber that has 5 cu. ft. of clear air than if it takes place in a chamber having only 10 per cent of this space. There is, however, an added hazard in this air space idea in that the mixture of gas and air is highly inflammable and as the gas often reaches the air far above the ignition point there is likely to be a secondary explosion in this confined space that is as serious as the original or more so.)

(e) Poor insulation. (It seems a little out of place to speak of poor insulation as a part of this particular problem. It is a general criticism of all electrical apparatus and does not at first appear to apply to the general problem of oil switch in any peculiar manner. The phase of the general insulation problem that should be considered is peculiar to oil and air break switches and has not received the attention that it should. This is the fact that the interior of such a device is an active generator of ionized gas. The hot gases from the arc are highly conducting and exposed live metal is dangerous. It is essential that grounded parts such as the tank and cover be treated as if the interior of the breaker were full of conducting gas at all times. While the oil is a good insulator it is a poor isolator as it is liable to be blown violently away and solid insulators without cracks should be used as far as possible to reinforce the oil at critical points.)

(f) Piston action. (During the operation of the breaker the tank fills with gas under pressure. In many designs there results an action exactly like a plunger pump. The tank with its cover form a closed chamber into which projects a plunger consisting of the wooden rod that operates the moving contacts. Suppose that the internal pressure amounts to 10 lb. per sq. in. Suppose further that the rod is 2 in square or has an area of 4 sq. in. There will result an opposing pressure of 40 lb. per tank or 120 lb. total acting upwards on the three rods of a three-pole breaker. If the breaker is designed to open by pushing down on these rods the force must be great enough to overcome the greatest pressure that can possibly be exerted by the internal pressures in the tanks. Where the breaker simply falls open by the weight of its parts this force is rarely great enough and some failures of breakers are due to the contacts being blown together again after the circuit has been partially opened.)

In conclusion it may be said that for moderate sized stations, say those of 5000 kw. and less, the present designs of standard breakers are amply safe and for stations of twice or three times this capacity they may be safe under certain conditions. For larger stations they are safe in localities where they are not exposed to the full force of the generators. The problem is further modified by the nature of the prime mover and the reactance of the distributing system. On very large stations only the best breakers are good enough and there are some breakers that are in excellent repute that are certainly not adequate for the service for which they are being sold.

Much may be accomplished by the use of limiting reactances and the proper grouping of blocks of power. Time element relays assist the breakers but for other reasons, are objectionable. While there will undoubtedly be a tendency on the part of manufacturers to continue to sell certain obsolete types of breaker the problem is now so generally understood among operating men that there will result in the very near future a general revision and redesign of such apparatus to bring it up to date and in line with our present knowledge. No one who has followed the progress of development of other branches of the business can doubt that there will result a better breaker than any now on the market.

Work has been commenced on Balboa substation in connection with the 44,000-volt transisthmian transmission line. The requisite excavation is estimated at approximately 4000 cubic yards. The site selected is at the base of Sosa Hill, on the east side, near the present Balboa dispensary and opposite building No. 9—the galvanizing plant of the Balboa shops. The substation is to be situated between the highway and the hill, and this necessitates cutting back into the base of the hill to give the desired clearance. This site was adopted on the recommendation of a committee, which considered the plan of installing the substation equipment and an air compressor plant in the same structure, but voted unanimously against it. The building to be erected will be like the substations now in course of erection at Gatun, Cristobal and Miraflores. The electrical installation will be performed by the Division of Erection.

Alternating current motor cranes for cargo-handling will, for purposes of economy, supplant the d.c. 20-ton French crane and the five cargo-handling Shaw cranes on the steel pier at Balboa. The new a.c. cranes will conform with the 3-phase, 25-cycle standard set for the canal equipment, beginning with the steam electric plants at Gatun and Miraflores, and followed by the hydroelectric station and the motors in the locks. In making these changes, as well as current repairs to the superstructure of the wharf, the superintendent and chief engineer of the Panama Railroad, who controls the docks, is bearing in mind the provisions of the circular of November 11, 1913, that all wooden dock structures in the canal zone shall be destroyed or so altered as to be made ratproof, by January 1, 1919. It will probably be practicable to retain this wharf in service after that date; in any event, the cranes could be transferred to any of the new concrete terminal docks.

A PIONEER TELEGRAPH LINE.

BY JOE BEANE.

(In this article. early construction difficulties met and the methods employed in connection with the installation of a particular line are detailed. Part of this line, though in service more than fifty years, is still used for other purposes. The permanency of red cedar poles is also emphasized.—The Editors.)

In the years 1861 and 1862, the boom days of Nevada, a two wire metallic circuit telegraph line was constructed crossing the Carson Sink, running west from Carson City to the coast and east through the Carson Sink by the way of Wadsworth, Ragstown, Salt Wells, Eastgate, and Austin, a distance of some two hundred miles.

Forty per cent of the distance is through the desert and alkali flats and some idea can be formed of the magnitude of the undertaking when it is considered that all the material was hauled with ox teams and that it was necessary to carry enough water and feed for an average trip of five days.

The poles used which were sawed red cedar 4 in. sq. top and 8 in. sq. butt, 25 ft. long and spaced 30 to the mile were milled in the mountains above Carson City. They were distributed along the line at a cost of $2.50 per ton mile for cartage.

Where the line ran through the alkali flats the butt was treated by having a hole bored at the ground line and filled with crude oil after which the hole was plugged. Just what the oil was and where it was shipped from I have no way of telling and of all the poles that have been examined by the author none have been found that were actually treated in this way.

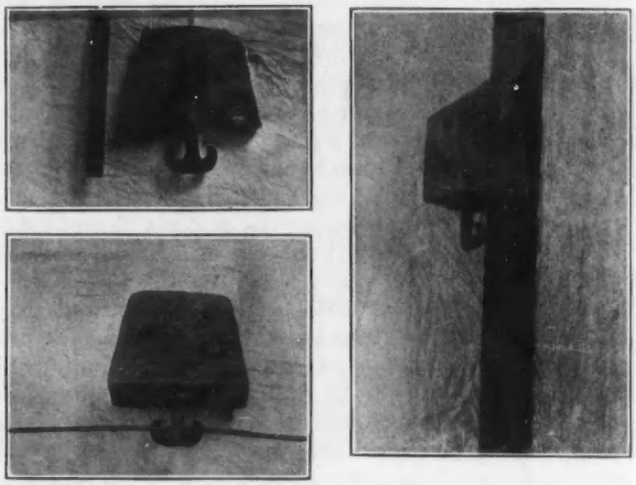
The first illustration is of the butts of some twenty odd poles. They were dug up from an abandoned section of the line and hauled in to be used on farmer's extensions to the present telephone system. It will be noticed on examination that the rot which has occurred is almost evenly distributed over the entire section that was in the ground and does not follow the accepted rule of the rot taking place at or near the ground surface. By whittling it was found that the decay did not penetrate to any depth and that the center of these sawn poles was as solid as fresh cut lumber. The section of the line that the poles were taken from took in the extreme conditions; through a sand bank that was never wet to a depth of over 12 in. and an alkali flat that was under water 6 months of the year.

Butts of Red Cedar Poles After Fifty Years Service.

When this line was first put in service all trouble was taken care of by a lineman using a ladder, so

there are no hook marks on the poles but they are pitted in places to a depth of ¾ in. on the windward side, from drifting sand.

In the early days, 1860 to 1870, a great deal of trouble was experienced on account of the pioneers tearing out sections of the line for firewood or to repair their wagons (prairie schooners), as barring sagebrush these poles were the only wood within twenty to fifty miles and in some places it was fifteen miles to sagebrush. For this reason it was necessary to move sections of the line away from the wagon road and the practical route and remove the temptation of taking this necessity from where it could be gotten most conveniently. The line would be moved to a new location but the pioneers headed



Details, Installation and Use of Block Type Insulators.

west with their families would invariably follow and start a new road, at times going miles out of their way. Considering that this was an unmapped country and the constant risk of an Indian uprising they would naturally stay as close as possible to the only sign of civilization—the telegraph line.

Running parallel to a section of this old line is a U. S. Reclamation Service telephone line with the wire strung on sawed redwood poles set in 1905. surface to the depth that it was originally set. In 1913, fifteen of these poles scattered over a 7 mile stretch, but with no two consecutive poles, rotted off at the ground surface were kept from falling by the telephone wires attached and until replaced or reset stood vertical swaying with the wind.

Northern cedar poles that have been in the ground four years show a decided decay at the ground surface and it is estimated that it would take twenty years for the butt to be completely rotted off.

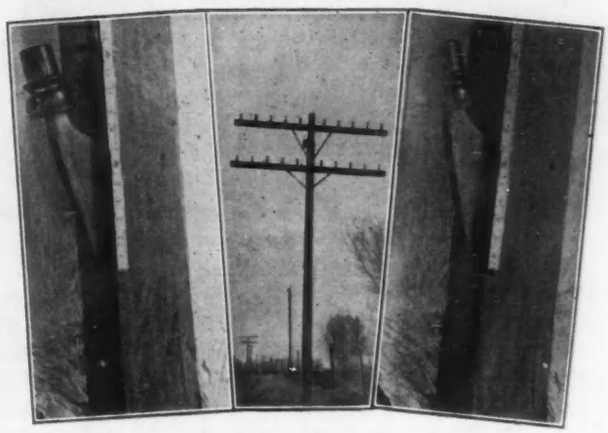
The butts of pine poles 6x6 in. that have been used for temporary connection have also rotted completely within two or three years.

In another illustration one of the poles is shown. The county telephone system has replaced the original wood insulator with two 10 pin cross arms, but the pole is still carrying 16 wires. One of the original insulators is shown still in place.

The original insulator used consisted of an oak block drilled and tapped, and an iron hook set in a gutta-percha bushing screwed in the tapped hole. No tie wire was used but the cramping of the wire by the two prongs of the hook was supposed to hold it from sliding. The blocks were fastened to the pole by three 5 in. cut nails.

About the year 1885 the insulator blocks were superseded by the glass insulator and bracket shown. The bracket is similar to the standard side bracket in use at the present time except that they were not threaded, putty being used instead and the insulator driven on the taper. It was sometimes necessary to wrap the bracket with a piece of rag in order to make a tight fit.

The telephone connection between the Churchill county telephone system (owned and operated by the



One of the Poles Still in Use With Insulator Attached—Also Illustrations of First Side Bracket Insulators.

county) exchange at Fallon and long distance calls outside of the county are made over 30 miles of the original telegraph line converted to a telephone line, glass insulators now being used and runs from Ragtown, a pony express station on the overland trail to Wadsworth. The maintenance for the last three years on this stretch of line has been $23.45 or $7.82 per year with an average of 12 long distance calls per day.

The original wire was No. 9 soft iron untreated and shows practically no depreciation from the weather. The present lines of the original wire have become crystalized from the continual swinging and it is now difficult to make a splice without using sleeves but there is little trouble from breakage on the line.

The aluminum output was 72 1/3 million pounds last year in the United States. There has been a steady yearly increase since 1883, when only 83 pounds were produced.

A bill to prevent crowding on street cars has been reported to the Massachusetts legislature. The bill requires that the passengers standing after the seats are filled shall not exceed 50 per cent of the seating capacity of the car, and that the capacity shall be posted publicly in the car, so that it will be a simple matter for any man with complaint to count and see if the law is violated.

ELECTRICAL MERCHANDISING BY MODERN METHODS.

BY THOS. E. COLLINS.

(In this heart to heart talk which was presented before recent meetings of the Alameda County Electrical Development League and the San Francisco Electrical Development and Jovian League, the author, who is manager supply division, San Francisco office, Westinghouse Electric & Manufacturing Company, differentiates between "dealer" and "contractor," describes the small electrical store as it used to be and as it should be now, and then gives much valuable information regarding advertising, window-dressing, and selling.—The Editors.)

At the outset I wish to make a distinction concerning the general term "electrical contractor," as I believe this is a misnomer. To my mind the term "electrical contractor" conveys the idea of the man who engages in the business of wiring large buildings or erecting distribution systems and other work of this nature.

The man who engages in the business of retailing electrical appliances, motors and electrical commodities generally, I term an "electrical dealer," and while the latter does engage in small wiring work, in the installation of fixtures, repairs, extensions and work of such a nature, yet he is considered a dealer.

The contractors and dealers should differentiate in the use of these terms and generally classify their respective fields of industry a little more closely in order that the public and others may recognize and use the terms properly.

My remarks are directed solely to the electrical dealer, and I want to make my position clear, that should I bring out any points which are in the nature of criticism, that this criticism is intended as constructive, or for the purpose of building up and not as destructive or tearing down. I feel that I am one of you, that your interests are mine and that your success I am dependent upon; consequently, I am not here as a lecturer nor as a teacher to tell you how to run your business, but as a comrade to bring to your attention certain factors in business which built up other firms and which can be utilized by the electrical dealer to his profit.

The subject is a very broad one upon which many volumes have been written and as it is impossible for me to cover all the variable quantities, I feel that I can touch only upon the high spots and advance some ideas for your further consideration and reflection.

The Old-Time Electrical Store.

Let us go back a few years and endeavor to draw a mental picture of the electrical dealer as I saw him when traveling on the road and soliciting his business.

In the country town I walked down the principal street in search of his store—as a rule I did not find it on the principal street unless at the outskirts—usually I discovered him after due and diligent search, secluded either in an alley or in an out of the way place.

I gazed in his shop window; the glass was dusty —more or less. On the side of the wall next to the glass usually hung a huge placard illustrating the various sizes and types of incandescent lamps. The unpapered white walls showed signs of age and distress, punctured here and there with nails or holes. The flooring of this window was uncovered; in the center sat a little second hand motor—I knew it was second hand from its appearance—a rheostat lay on one side of it, an electric iron on the other; a knife switch stood guard in front, and a pair of overalls in the background completed the setting.

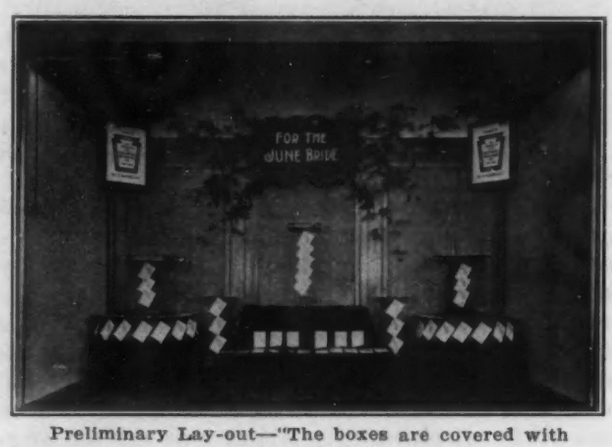
As I opened the door a little automatic cow bell announced my entry; the boss was busy reeling off some wire, but said he would be out in a minute, so I directed my attention to his store. On my right lay several coils of wire and a barrel or two of knobs. A step ladder or two helped to hold up the side wall and in the rear was a miscellaneous assortment of junk and a work bench. On the left was a counter about twelve feet in length built of soft redwood; at one end a scale, a pile of booklets and pamphlets, unsorted. Back of this counter were several rows of shelving filled in partly with cartons of incandescent lamps, a fan or two of ancient "vintage," a supply of tapes, knife switches, buttons, magnet wire and other miscellaneous supplies—the balance was empty.

When my time came to open up on the proprietor, I suggested that I would like to sell him some of my electric irons, but I got no further than the suggestion for he told me that my irons were handled in that town by a hardware man up the street and any manufacturer who sold to a hardware man could not sell to him, and so on.

Now—a situation such as I have pictured may not exist in our big cities today, but, nevertheless, it is not overdrawn so far as many localities are concerned, and I am sure all of you have seen the same scene as I have mentioned, and it still exists; yet this man was an electrical dealer and hoped some day to establish himself in a finer store. To me failure was painted all over his place—insofar as becoming a retail merchant was concerned.

Adopting Methods Making for Success.

Let us take another view of handling this same situation by another man who is alert and utilizes the methods of successful merchants in that same town, assuming that this man has purchased the business of the former. He first secures a better location on a street—not necessarily the principal one, but where he can be found without the aid of a compass. His



Preliminary Lay-out—"The boxes are covered with black cloth."

windows are cleaned and kept cleaned; his sign work is neatly done, and on the top of his building (a one story affair) he erects a bill board about 8x12 ft. in size. He illuminates this at night with a few incandescent lamps controlled by an automatic time

clock switch. Posters for this billboard are gladly furnished by the jobbers and manufacturers and the town painter can be utilized when copy is changed or exhausted. Some dealers effectually utilize an illuminated clock with the correct time and it becomes a landmark.

His walls, particularly those of his window, are suitably papered to harmonize with his wares. On the walls are fresh clean display cards, lithographs or other art advertisements neatly staggered for artistic effect.

The floor of his window is covered with linoleum or heavy paper in imitation hardwood. When he displays nickel-plated heating devices, the boxes are covered with black cloth to "bring out" or amplify the polished finish of the appliances.

Next week he changes his window to display fans and other devices. The fans are in operation with an American flag floating in the breeze.

When the display of appliances is at an end, he builds a lighthouse in his window out of knobs, cleats and so forth, flashing its light with a skidoodle socket.

His store is divided in the center by a neatly finished and painted partition screening the junk pile, the work bench, the ladders and the overalls.

The top of his counter is covered with linoleum or other suitable covering.

His advertising matter is carefully assorted and filed in a rack for that purpose—similar to the ones used by the railway companies for their folders. His supply is suitable, a small quantity of each; he does not desire an excess quantity simply because it's free.

His shelving is attractively covered by dark cloth to set out the beauty of his domestic appliances. His excess space is filled—every bit of it—with cartons, some containing lamps, but mostly empty; but, nevertheless, the places looks well stocked and affluent. His display of fixtures are neatly hung and connected for lighting; a dark room or other suitable surrounding can be built for the proper display of fixtures at a small cost—I never saw a dealer yet who could not do a little carpenter work—a dab or two at painting and sometimes hang wall paper, but the latter I suggest leaving to the paper hanger. I mean this however, that if you have the mind and the energy, the necessary capital need not worry you—you can get around that all right.

Specialized Selling and Quality Sales.

This live dealer does not object to handling my goods because the hardware man is trying to butt in on the electrical game. He knows that he is the electrical dealer of that town and when goods electrical are to be purchased, the buyers don't go to a butcher shop or a hardware store to find them. Furthermore, he knows that intelligent information concerning goods electrical can be furnished by him. He has paid attention to the salesman's selling talk when he bought the goods and he uses it on his customer when he is told that she can buy an iron up the street for $2.39. He shows her the merits of his product and gets his higher price, and a customer who goes away satisfied because she has an article of superior merit.

Value of Activity in Public Affairs.

This type of man belongs to the local merchants' association or improvement club, and acts in an advisory capacity to these bodies in matters electrical. The merchants and business men know him and patronize him, and speak well of him.

When I sell him a bill of goods, my advices to our credit manager are that he is enterprising, well spoken of and has the confidence of his fellow citizens and, therefore, worthy of our confidence.

The Completed Window Display is Attractive.

It is not our policy to consign goods, but should he exhibit a centrifugal pump under operating conditions at the Apple Show or County Fair, I am always glad to lend him a motor to operate it. In short, I recognize a live man—a coming business man—and I am glad to trail on behind him—referring my inquiries to him as my agent or dealer.

Electricians or Merchants?

Years ago we were all electricians—how beautiful that term sounded to me—how proud I was to tell my girlish sweetheart that I was an electrician and, of course, my father's friends and my companions considered me in the same class as Thos. A. Edison. Then we all graduated, we became electrical engineers, but now when these terms are sprung on us, we recognize the bell-hanger and the student fresh from college. Today the successful electrical dealer is a merchant. He has laid aside idle dreams and titles and adopts the same selling methods as the clothier, the hardware man and the others of his town.

He arranges his store and stock to be neat and attractive; he pays attention to the salesman's selling talk to learn the features of the articles and is able in turn to utilize the argument that sold him the goods. He becomes resourceful and with it comes increased patronage.

Relationship to Other Lines of Business.

To illustrate further. In an endeavor to practice what I preach, I frequently purchase a hardware magazine—not because I am interested in hardware, but to gain a knowledge of their methods of doing business because the hardware man is the genuine merchandiser handling a thousand and one articles and selling them all. This magazine will devote a page to short snappy slogans such as can be utilized in advertising—another page to an illustration and description of window dressing. In fact, they offer prizes for the next and most attractive window displays. Another page will be devoted to successful salesmanship—showing you how a clerk can put up

an eloquent talk to go to the ball game, but to a customer can only say "absolutely guaranteed" and "110 volts," and I have seen just such lads acting as clerks. Other pages will be devoted to cost accounting, price cutting and other topics of interest.

The day is here, when you have to read and study articles of this nature and adopt them if you intend to successfully compete.

Electricity an Open Book.

The day of mystery is about over in the electrical business—even the school boys are up-to-date in matters electrical; they read electrical magazines and are acquainted with the workings of Ohms law; they delve into wireless and other phenomena, and the questions they sometimes ask put many of us on a barrel for the answer. The coming generation are going to expect many things from the electrical dealer, and he must be prepared to fulfill them.

I don't mean to convey that the merchandiser must be a technically trained man in matters of electricity, but if he can secure as a clerk one of these bright young lads who delve into the science, then he is better able to fulfill the expectancy.

Someone in the establishment must be a merchandiser and if you are capable of handling the electrical problems, then your assistant should study modern business methods. Sometimes we find a man who can happily handle both ends of the business, and, of course, he is doubly equipped.

Need for Correct Business Correspondence.

I might say a word or two on the art of writing business letters. I frequently receive letters in longhand from electrical dealers, but I think a better impression is conveyed by the use of the typewriter and a neat conservative letter head. It's one of the many refinements which characterize the modern business man and the operation of a typewriter is a simple matter.

These pertinent remarks are not directed to the members of this league because you represent or do not represent the characters described. I am endeavoring to do my humble share in the advancement of the industry and I am sowing seed for thought and reflection with the idea that your association spread these further and endeavor to assist and build up our weaker brethren.

[To be continued.]

In the interests of better telephone service on long distance calls, a blotter is being distributed among its subscribers by the British Columbia Telephone Company. A diagram in the form of a clock face is shown which has the sections between the figures shaded to various depths representing the density of the traffic during each hour of the day. The statement on the blotter which best explains its purpose, is as follows: "The dark shaded portions of this diagram denote the periods of the day when long distance traffic is heaviest. Long distance calls can be completed with greater dispatch during hours when traffic is lighter. Appointments to talk at a later time may be made at any time of the day, and the person calling will be advised by the long distance operator whether the appointment is satisfactory to the person called."

RAIL AND STEAMSHIP TERMINAL FREIGHT HANDLING.

BY W. D. PEASLEE.

(Continued.)

Outline of a Particular Problem.

A single wharf will be taken closely following Pacific Coast conditions as found in several places, laid out as in Fig. 2. The incline from the ship's hold to the dock will vary with the tide from a grade of 20 per cent to level. Freight will be discharged from the two side portholes to the lower dock and from the two hatches to the upper dock. It will be brought to the dock by rail and from local shippers by autotrucks and piled in the outgoing section daily.

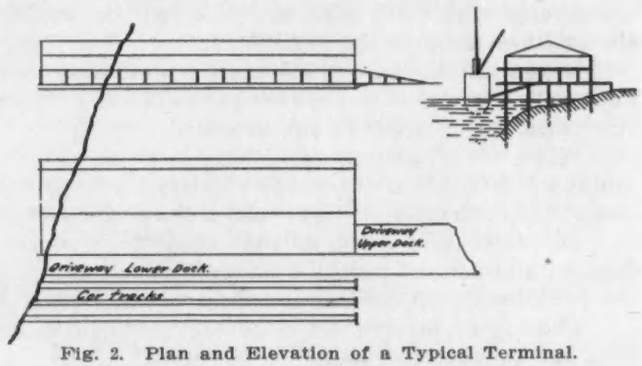


Fig. 2. Plan and Elevation of a Typical Terminal.

On the arrival of a ship the incoming cargo will be unloaded to the dock or dock and frieght cars and the outgoing freight will be loaded from the dock into the ship. The dock will be built of timber, supported on piling, with the vertical clearance between floors 10 ft. The floor of the dock and inclines will be heavy planking.

The ships will carry in incoming cargo of 1250, and will take out a cargo of 2100 tons of miscellaneous freight.

Approximate Labor Costs.

Under the present method of manual loading, unloading, trucking, and piling, studies of actual cases show that for average conditions 120 men with the help of the two ship hoists at the hatches will unload the 1250 tons in 9 hr. from the ship to the dock and will load the 2100 tons from the dock to the ship in 18 hr., trucking an average distance of 240 ft. Stevedore labor is paid $.55 per hour in most places, so the labor cost of handling the 3350 tons between the dock and ship is $1782, or $.533 per ton plus the cost of checkers, weighers, markers and superintendence. This cost it will be noted is for handling between the dock and ship and does not include loading from the dock to the freight cars or vice versa. As the cars are seldom available when the ship is being unloaded the loading from the ship direct to the cars of the re-ship freight is not always possible and the freight is piled on the dock according to its destination and loaded into the cars when they are available. Also freight is arriving at the dock daily and must be piled and held until a ship comes in to take it. For this reason it will be necessary to keep a force of common labor at a lower rate of wages to do this daily work, employing stevedores only to do the rush work of unloading and loading the ships.

Time studies and actual installations show that in loading from the dock to the cars and vice versa

by hand trucks with such a force of common labor a cost of about $.40 per ton will be met, and that such a crew will handle about .55 ton per man per hour, trucking an average distance of 400 ft. As the loading from the dock to the cars and vice versa is steady work it is paid for at from $.20 to $.25 per hr. The rate paid stevedores is high but they are worked at the highest possible rate in order to get the ship away with the least possible loss of time with its resulting standby charges, while the rate paid the common labor is low they cannot be worked at such a rate as the stevedores and it has been found that the labor cost of handling is roughly the same in both cases, ignoring the value of time saved by the rapid handling.

In approximate figures the labor charge for handling local consignments is $.533 plus checking, marking, weighing and superintendence and for consignments that require shipment by rail $.933 plus checking, marking, weighing and superintendence.

Solving the Problem.

Referring to condition 1 of a perfect freight handling system it will be seen that the handling device, to meet this situation best, must be able to go into a freight car, up and down the incline from the ship to the dock when fully loaded, and into any part of the freight hold of the ship. It must be able to get around among piles of freight and through narrow lanes. Any device running on a track is out of the question as tracks cannot be laid easily in the ship or cars and the tracks would use too much valuable storage space. Elevators are used in the ship between decks and elevators or inclined planes may be used between the floors of the dock. The arrangement does not lend itself well to the installation of cranes. Telepher systems work best when they can be run between rows of cars and such an arrangement would require in this case a very large investment and a long transportation and would not, with the present design of ship, be easily installed to serve the interior of the ship. Slides and moving belts are very successful with special freight such as grain and small boxes of uniform size but do not handle miscellaneous freight well.

The Storage Battery Industrial Truck.

The choice of transportation device is then narrowed to a trackless equipment and from the dimensional requirements the storage battery industrial truck is found the most adaptable unit. It is built in such sizes that it will run into the hold of a ship, in the ship elevators, and into freight cars. It is built in capacities from 2000 to 3000 lb. and the 3000 lb. truck will handle 2000 lb. on the maximum incline met here. It will cost according to special features required, from $1000 to $1200 f.o.b. Pacific Coast points. From a safety point of view they must be so arranged that they cannot be operated unless the operator is in his proper place so that any accident causing the operator to leave his position will stop the truck.

The data on a typical truck will show the degree to which these requirements have been worked out by the truck manufacturers:

Capacity	3,000 lb.	Length over body	6 ft. 8½ in.
Speed empty	5¾ mph.	Length of platform	6 ft.
Speed loaded	4½ mph.	Width	37 in.
Weight with battery	2,000 lb.	Height of platform	18 in.
Battery capacity	192 amp. hr.	Height over all	51 in.
Turning radius of outside wheels	6 ft.		

Two sets of brakes are provided one service set and one set so arranged with the control that if the driver takes his foot from the pedal the power will be shut off and the brakes applied. The power cannot then be applied until the controller is brought to the off position. All bearings are Hess Bright or Timken and the wheels are steel with solid rubber tires. The frame is of commercial channel steel throughout giving maximum strength with minimum weight.

The above data is taken from a standard truck furnished by one of the large manufacturers and is typical in all vital points of the product of several manufacturers.

Industrial Truck Performance.

Time studies and actual installations indicate that these trucks will handle an average of 15 tons of miscellaneous freight per hour a distance of 250 ft. when loaded with 2000 lb. and a little more when loaded with 3000 lb. with two men loading and two unloading. As they will handle 2000 lb. on the maximum incline that load will be used in the following computations. The trucks are narrow enough so that one can enter the ship porthole while another is coming out so the rate of work can be maintained.

Time studies show that two men will load one ton onto such a truck in an average time of 58 sec. and unload it in 62 sec. average. On the first deck of the ship at each porthole four trucks may be loading at all times and the ship's elevators at each porthole will handle trucks at the rate of one per minute, so two loaders on the lower deck at each porthole will keep trucks loaded as fast as the elevators can handle them between decks. We will then have at a maximum rate five loaded trucks per minute leaving the ship from each porthole. This maximum rate cannot be maintained, but it has been found that a rate of one truck every 40 sec. and as the operators become more familiar with the equipment a still better rate may be expected.

This equipment will, therefore, handle 90 tons per hr. from each porthole, with ten loaders per porthole for the two decks. The rate at which freight is discharged from the hatches is governed by the capacity of the ship's hoists and a rate of 30 tons per hr. per hatch can be maintained with most ships with 8 men in the hatch handling and slinging freight.

Thus loading or unloading from the two hatches and both portholes a rate of 240 tons per hr. can be maintained with this equipment and the ship unloaded to the dock in 5¼ hr.

As the unloading of the trucks on the dock is to be done by hand it will require according to local conditions, about the same number of men as are employed in loading the trucks in the ship. A mechanical unloading system would require the use of flats to fit on the trucks which could be taken by a telepher system and distributed. Considering the small force required to unload by hand and the large capital outlay necessary to provide such a system it will not be considered here as a short study will show that it will not be productive of any saving. Twenty men will be required to unload the trucks from the portholes and 8 will take care of those from the hatches. Since the average trucking distance is 240 ft. and each truck

will run about 600 ft. per round trip the time per round trip average will be

Average Time per Round Trip.

Loading	58 sec.	Unloading	62 sec.
Running	90 sec.	Total	3½ min.

To this add 1½ min. per trip lost time and it is found that a truck will make an average of one round trip every 5 min. or 12 per hr. and as 90 truck trips per hr. are required from each porthole we have 8 trucks per porthole. To allow for further lost time and emergencies 10 trucks per porthole will be allowed. In the same way it is found that 3 trucks are required at each hatch. No spare units will be needed as the maintenance work on the trucks can be done between arrival and departure of ships.

Crane Equipment on Trucks.

Two of the trucks at the hatches will be provided with motor operated cranes capable of lifting 2000 or 3000 lb. to handle heavy pieces of freight. Inclined ways or elevators will provide a means of transferring freight between the upper and lower docks.

Operating Costs.

The operating cost of these trucks, including operator's wages, interest, maintenance and power varies with the service from $3.50 to $4.50 per day. Taking the high figure an operating cost of $.50 per hr. will be used in these estimates.

Under these conditions the following crew and equipment will be required for the proposed installation:

26 industrial trucks and operators, two of the trucks equipped with cranes.
20 stevedores in the portholes.
28 stevedores on the docks.
16 stevedores in the hatches.

The ship's crew will operate the ship's elevators and hoists. This crew will unload with the equipment outlined 1250 tons of miscellaneous freight from the ship to the dock in 5¼ hr. and will load 2100 tons from the dock to the ship in 9 hr. The cost will be:

26 x .50 x 14¼	$ 85.25 for truck operation.
64 x .55 x 14¼	501.60 for stevedore labor.
Total	$686.85

This is the amount required for loading and unloading of trucks and truck operation. This is a cost of $.204 per ton but does not include weighers, checkers and markers, superintendence, depreciation, taxes, or insurance.

In handling freight between the dock and cars it is found from other installations under similar conditions that four men and one of the above trucks, which can handle 3000 lb. per load under these conditions since there are no inclines, will handle 10 tons per hr. steadily hauling 400 ft. and running into the box cars with the load. This at a cost of, one truck, $.50 per hr.; 4 men common labor, $1.00 per hr. Total $1.50 per hr. or $.15 per ton at a common labor rate of $.25 per hr.

We will assume further that a vessel arrives about every 4 days, that is, 90 per year, so that the total tonnage to be handled is 301,500 per year. Of this it will be assumed that half is of local consignment or origin and that half is to be handled between the cars and dock, so 150,750 tons per year must be handled between the dock and cars. This is 502.5 tons per working day for the common labor to handle. For this work 6 extra trucks will be provided with 24 men. This equipment will handle the freight at this rate easily with one truck and crew operating 5¼ hours per day. The rest of the time it can be used for any work that may develop extra.

Investment Required.

The total equipment of this terminal will be:

30 industrial trucks at $1200, using the high figure	$36,000
2 trucks equipped with cranes	5,000
Charging equipment, elevators, etc., estimated	7,500
Approximate total investment, f.o.b. Pacific Coast	$48,500

On the assumption that the arrival of the vessels is such that none of the unloading is done on holidays the present labor cost of handling the freight between the dock and ship, less the cost of weighing, marking, checking and superintendence is $1782 × 90 = $160,380 per year. Any Sunday or holiday work must be paid for at a time and a half rate which would increase this cost.

On the same assumption as to holiday work the cost under the proposed system will be:

$686.85 x 90	$ 61,816.50
Depreciation, 10 per cent	4,850.00
Taxes and insurance, 3 per cent	1,455.00
Total yearly cost	$68,121.50

The interest, power, operator's wages and maintenance are included in the operating cost of the equipment. This is $.226 per ton for the cost of handling, less weighing, marking, checking and superintendence, a saving of $92,258.50 per year on the cost of handling between the dock and vessel and represents a return of 190 per cent per annum on the investment required.

[To be continued.]

DISTINCTIVE FEATURES OF P. P. I. E. MACHINERY EXHIBIT.

The observations of men who have accumulated exposition experience have been drawn upon to outline features which will reveal to the highest degree the value of selective exhibits in all exhibit departments. In Machinery Hall, the following features will enhance the value of exhibits of machinery:

(1) Wherever practicable, at least some part of an exhibit should be in motion. Many machines can be in actual operation turning out products for the exhibitor's or for Exposition use. Exhibits which do not contain moving machinery can, in this day of easily available electric power, be given some feature of movement, which naturally attracts attention.

(2) Machinery accessories, though not in motion, can be connected or attached to show their use, and their educational value can, in this way, be enhanced.

(3) Machines can be shown in parts, and many fittings and accessories cut to show interior construction, which will be particularly interesting and instructive to all visitors.

(4) Products of machines shown in various stages of manufacture, from the raw material to the finished article, will call particular attention to the machines.

The machinery exhibit as a whole, embodying such of the features just named as are suitable to each individual exhibit, will be of maximum popular interest and instructive value; and it is hoped that no exhibitor will, by failing to embody at least some of the suggestions made, find that his exhibit is not attracting the same attention as that of his neighbor.

LIGHTING METHODS

GAS ARC LAMPS.

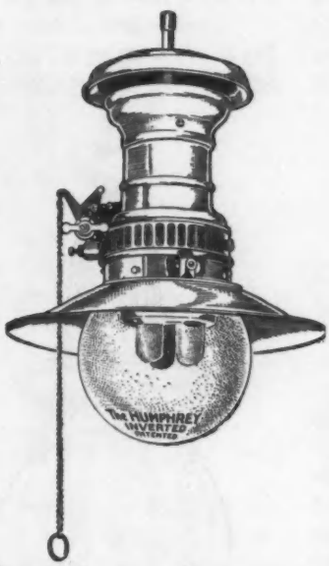
BY C. B. BABCOCK.

(The profitableness of gas arc lamp lighting is explained and its field stated, also the methods best adapted to secure this business. This contribution from Mr. Babcock, who is manager Pacific Coast office, General Gas Light Company, is the first of a series on the subject of gas lighting.—The Editors.)

What is a Gas Arc? The term is very well known and understood throughout the gas industry, but many electrical men often question the name "arc" as applied to a gas lamp.

Webster's definition of the word includes "electric light formed by passage of voltaic current between two carbon points," so very naturally most people associate the word "arc" with electricity, but though no dictionary, unless we manufacture one of our own, includes the word "arc" as applying to a gas lamp, we can go outside the authority of the dictionary and appeal to common usage.

Early Type of Four-Mantle Upright Gas Arc Lamp.



Standard Three-Burner Inverted Factory Arc Lamp.

Modern Three-Burner Indoor Inverted Arc.

Artistic Ball-Pendant Inverted Gas Arc Lamp.

For many years the public has used the term gas arc lamp and because the lamp has stayed in use the term has stuck.

A gas arc is a multiple mantle gas lamp. One that gives light from mantles, only instead of there being only one, there are three, four, or more mantles, clustered in each lamp.

When A. H. Humphrey built the first successful gas arc lamp, upright mantles were used; this type of lamp continued in use for a number of years until the inverted type of lamp was evolved, and this design was adopted because of its greater efficiency, both from a maintenance standpoint and better distribution of light downward.

In this lamp, gas is supplied to a heated chamber in which it is expanded, rarified and brought into a condition for a most intimate mixture with air which has been conducted through the ports of the Bunsen burner. Perfect combustion is thus obtained with the most intense heat which causes the mantles attached to burners to become brilliantly incandescent, much more so than in an ordinary single burner lamp. Above the mantles and around the burner parts is a sort of chimney or stack which helps make the proper draft and is a big factor in making a bright light in the mantles.

Of course there are devices to regulate the amount of air and gas which goes to the burners and to meet any possible fluctuations in the gas supply from the city mains.

There is also a small pilot light, which consumes an infinitesimally small amount of gas, burning in between the mantles continually. By pulling a chain which hangs from the side of the lamp, gas is allowed to flow freely into each mantle and is ignited from the pilot light. Another pull of the chain will stop the flow of gas and turn off the light, at the same time leaving the pilot light ignited.

A round globe surrounds the mantles and softens and diffuses the light.

Gas arc lamps have enabled live gas companies throughout the world to hold their own against electric competition. If the old open flame and single mantle types of burners had been used, gas lighting would have fallen before the onslaughts of its competitor, for with the use of single gas units, maintenance costs were high and efficiency low.

Manufacturers of gas lighting units have endeavored to keep pace with electrical development, and through the gas companies are offering the pub-

lic arc lamps that are not only artistic in design but economical in use of gas. The illumination from this source of light is excellent, giving a pure, mellow, steady light, which does not strain the eyes.

One reason for the excellence of gas illumination is on account of its larger source of light. The electric lamp has a very fine filament from which the

Outdoor Five-Burner Gas Arc Lamp. This Lamp Develops 900 Candle Power or 50 ft. Candles on Low Pressure Gas.

light emanates and unless proper auxiliary equipment is used this brilliant filament is hard on the eyes.

Now, for the commercial value of gas arc lighting. To the straight gas company or allied gas and electric company, I contended that gas lighting is the cream of the business, also giving a greater revenue than any other gas burning appliance, when cost of investment is considered. Furthermore, gas lighting is the best kind of advertising for the utility company. It not only produces revenue for the gas company but advertises its product, as well as conveying to the public the advantage of gas, not only from an illuminating point of view, but for every other purpose for which it is manufactured.

Gas ranges, water heaters and so forth are installed in the kitchen, or in places seldom seen except by the individual consumer, but gas lighting is ever before the eyes of the public.

Cost of Installation.

Gas Range.

5 light meter	$5.00
Meter connections	.50
Piping range	3.75
	$9.25

If a free service is run, another investment by the gas company must be considered, which will probably average a little over $10 for each service.

Gas Arc Lamps.

3-burner type	$7.75
3 mantles at 10 cents each	.30
Freight, etc.	.40
Labor	1.00
	$9.25

We have not mentioned the cost of meter, as practically all business houses are provided with meters either for actual use in connection with some appliance or for emergency purposes.

The Comparative Income.

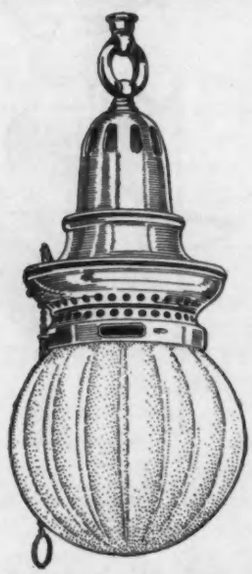
It is safe to assume that a gas range will not consume more than 18,000 cu. ft. per annum, maximum.

Consuming 12 ft. of gas per hr. and burning an average of 3 hr. per night for 310 nights, the 3 mantle lamp would consume 11,160 cu. ft. per annum. I estimate that the average installation would cover at least two lamps, and in this case the yearly consumpiton would be 22,320 cu. ft. of gas. It must be admitted that these conservative though almost incredible figures are convincingly in favor of gas lighting.

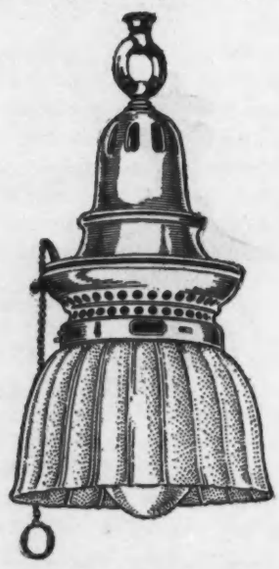
Maintenance.

The experience of the average gas company is that all trouble trips and minor repairs on gas ranges are done free of charge as a matter of service.

Lamps are cleaned and inspected at least every ten days. A man at $2 per day will take care of an average of fifty lamps, and the average cost per inspection



Two-Mantle Inverted Gas Lamp for Use in Low Ceiling or Small Area Business Places.



Single Large Mantle Inverted Gas Lamp, Giving 225 Lumens.

and maintenance will be 4 cents each, including labor and material.

Most companies charge a rental or maintenance of 50 cents per lamp per month, but a minimum charge of 25 cents per month should pay all expense of maintenance. In fact, we may estimate the whole cost on the following basis:

Cost of Lamp Maintenance.

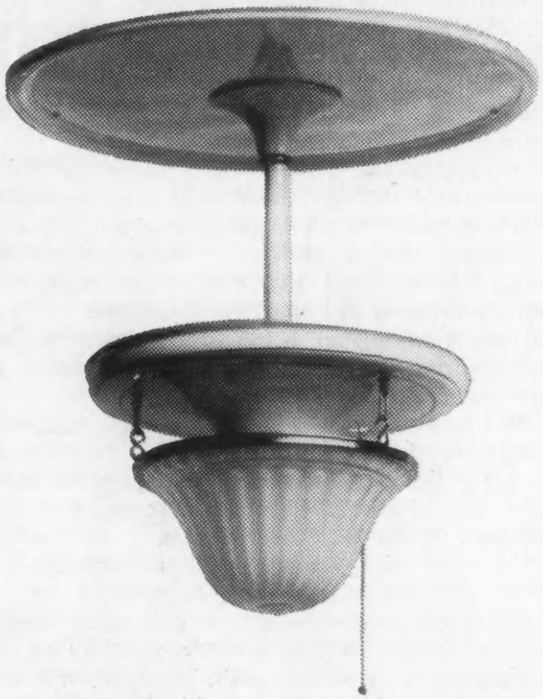
Yearly cost of labor per lamp	$1.44
Average of one mantle per month per lamp (12 mantles at 10 cents)	1.20
Broken glassware and extras (about)	.36
Total	$3.00

Street Mains.

It is a fact that large expenditures for main extensions are absolutely necessary to meet requirements in outlying sections, and this means a heavy expense and drain on the resources of the utility company.

Gas arc lamps sell gas in the down town business sections where mains are ample. No capital expenditure for new pipe is required. Services are put into use and produce revenue from plant which would otherwise be rusting out, in fact, depreciating with no revenue forthcoming to offset this item.

There are constant disputes over meter rentals on account of no consumption shown, but when these meters are put into use by the installation of gas arc lamps, this source of complaint is eliminated.



Three-Burner Inverted Semi-Indirect Gas Arc Lamp. Beautiful in Design and Very Efficient.

The installation of gas arc lamps is with substantial business houses, checks are sent in promptly by pleased consumers, and without doubt the fact that they use gas in their place of business is bound to be a strong incentive to use other gas burning appliances in business as well as in their homes.

Over 75 per cent of the gas companies in the United States and Canada retain title and ownership to the lamps installed, placing them on the premises of the consumer on a rental basis. This plan gives the utility company complete control over the lamps and insures them against neglect and disuse from poor service. Whether the lamps are sold or rented, the utility company should exercise supervision over them and see that they are kept at highest efficiency, and there will never be any question as to the profitable revenue from commercial gas lighting.

It is good sound business policy for the straight gas company or allied gas and electric company to install gas arc lamps. Some few years ago a number of combination companies were reluctant to engage in the business fearing that gas lighting would hurt their electric business. This is not true, in fact, the opposite has been proven conclusively, in that an added impetus to the use of electricity for illuminating purposes has been brought about, and furthermore, the standard of illumination has been vastly improved.

Observe the average city where only one kind of lighting is used, whether it be gas or electricity, and invariably you will find that city poorly lighted.

On the other hand, the city where both gas and electricity are pushed for lighting purposes is the city in which you will find better lighted stores and more profitable business the order.

The best plan for the allied gas and electric company is to divide their commercial department into gas salesmen and electric salesmen, for by specializing the best results will be obtained. In cases however, where the commercial department is very small, it is entirely practicable for the salesmen to sell both commodities.

The most lucrative field for gas lighting is for commercial purposes and street lighting. This is a field peculiarly its own, and one which if intelligently handled by the commercial department, is certain to be productive of remunerative revenue.

Certainly the installation of gas arc lamps in stores, factories, warehouses, machine shops, churches; the installation of outdoor lighting in front of stores, amusement parks, train sheds, docks, piers and for municipal street lighting, is not difficult to obtain with gas lamps when proper new business methods are used.

LIGHTING EQUIPMENT OR FIXTURES.

We must have more co-operation between the illuminating engineer, the glassware manufacturer, and the fixture manufacturer. In practice I have had a number of cases in the lighting of some very beautiful homes, where on inquiring as to whether the lighting is planned one is informed that all the fixtures are in and the only information desired is the size and type of lamp to use. Further inquiry as to who designed the installation reveals that it was left in the hands of the fixture manufacturer. The average individual seems to have the opinion that if the order for fixtures is placed with a high priced fixture house, that is all there is to do.

Examination of the house reveals the result. The fixtures in themselves are very elegant, correct in period, and of splendid metal working; but the equipment of glassware is really abominable. Roughed inside crystal shades and other cheap types of glassware abound.

From the standpoint of the illuminating engineer, the quality of the glassware is a most important item, for this controls the diffusion and distribution of the light. In the cases mentioned, the glassware used generally costs but a few cents a piece.

The fixture men place the period question far ahead of diffusion, distribution of light and protection of the eyes. There is no question that the artistic element is a very important factor, and the period must be correct, but we can have all these and also the protection of the eye and desired diffusion and distribution of light, because there is such a variety of good glassware on the market from which to make a choice; glassware can be secured which will not only harmonize with the fixture, but give all these good qualities.—A. L. Powell in discussion before the Illuminating Engineering Society.

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Refusing Profits

In every family there is a black sheep. Sometimes he is so from choice, at others given a bad name merely lives up to it, or yet again, may really be but neglected by its more ungainly brethren—a Joseph of immeasurable possibilities and importance.

The black sheep of the electrical family will be found to take practically no part in matters of interest to the industry as a whole, and the component parts of this branch will probably be found to be selfish, dissatisfied and even demoralized; conducting a barely profitable business and refusing maximum profit even where proferred or possible.

There is the exception always, but he but goes to proverbially prove the rule.

In lighting, the fixture dealer is, on the majority of installations, the one whose work may make or mar the service, as all the care exercised in properly wiring the building and in providing energy of sufficient quantity and pressure is wasted if maximum results or effectiveness in lighting is not secured.

Though paying for watts the customer wants effective lighting. The wiring and fixtures with their equipment, are a means to that end.

At Jovian and electrical engineering association meetings that branch of the electrical industry which is from the lighting end the most important, namely, those identified with the manufacture and installation of fixtures, is the least heard from.

The spirit of co-operation has not moved on the waters of their indifference.

The fixture man should be cultivated more intensely by the industry as a whole, for the lack of co-operation on his part—the harsh, inartistic, unsuited or improper use of his product—will do more to depopularize the use of electric lighting than any other factor and thus bring that which is eminently satisfactory if used rightly, into an unjust disrepute.

The fixture man is too far out of the fold for his attitude to be fair.

It is no secret that the business of the electric fixture dealer and the retailing manufacturer is comparatively unprofitable and that the same capital and energy expended in other branches of the electrical industry would, if allowed, result in larger profits.

Maybe because it is, perhaps the least profitable, many unskilled salesmen have drifted into these branches, but it is common knowledge that in many cities their object is to get the business without considering the effect of the methods by which it is secured.

Cheapness is shouldering quality for a place and "dog-eat-dog" tactics are altogether too prevalent.

It seems difficult for that branch of the business to display that spirit of co-operation evidenced in the effectiveness of other branches and essential to the success of all, for even where the best has been demonstrated and the customer satisfied that that is what he wants, there are fixture men who will produce fixtures from the bins of cob-webbed antiquity, representing a less expenditure and still smaller profit, and offer them as "just as good."

There is a crying demand for a higher morality in fixture salesmanship and honesty in expounding this doctrine of "just as good."

Nothing is just as good as the best and the sooner the fixture trade recognize this and co-operate together to the end of quality sales, the earlier will that branch of the business be placed upon a more profitable and enduring basis.

A dissociated fixture trade without quality is an economic impossibility.

The electrical industry in general wishes this cheap, unfair competition eliminated that the black sheep of the family may receive the coat of whitewash it now needs and will then have deservedly earned.

Common Practice

In this issue, the California Association of Electrical Inspectors suggest the formation of local common practice clubs in order to attain "a better and more uniform standard of electrical construction and to promote uniform interpretation of the rules which comprise the standard."

To do this would be to place electrical contractors on a more common footing, and if followed out to its logical conclusion should prove an advantage to the trade in general.

The adoption in 1906 by the National Electrical Contractors' Association and the American Institute of Architects of standard symbols for indicating electrical locations on plans, together with their general acceptance, has simplified immensely their uniform interpretation. There can be no question of the meaning of the symbols used.

This is commendable, for it is not the intention nor to the interests of either contractors or architects to have differences, due to misunderstanding or misinterpretation, regarding electrical contracts made between them.

Common practice, standardization, is largely a growth of custom, and the danger exists, therefore, of contracting rules or habits which do not readily change with the establishment of improvements. Common practice not controlled is conducive to conservatism.

The fact might be instanced, that notwithstanding the general adoption of the Mazda lamp, the symbols referred to still have, as their standard, the now obsolete 16 c.p. carbon lamp equivalent.

Adherence to the old order or method is to oppose change and to hinder progress.

Compliance with the existing order or method is to create common practice, and in matters which cannot be questioned and where changes in the materials used are not constantly taking place, this standardization is of great value.

An illustration of the effectiveness of this practice is found in the Ford plant, in which an automobile is completely assembled in exactly twenty-nine minutes after the under frame is placed before the workmen.

Such "common practice" is mighty uncommon.

Dissimilarity is temporarily advantageous to those who discover or evolve a better way of accomplishing any particular end sought. Dissimilar practice may be a mark of superiority and is one of the causes which make for the wide difference in competitive bids.

Another and perhaps more prolific cause consists in the interpretation of ambiguous specifications.

Here then is to be found the second and next logical step in the adoption of feasible common practice —the adoption of standard terminology in the writing of electrical specifications.

Almost invariably, the National Electrical Code is made a part of the electrical specifications, and this is another matter for disagreement, for it is found that the meaning of the Code is largely a matter of interpretation.

The suggestion of the California Section of the National Association of Electrical Inspectors should meet with a hearty response from all those interested, and undoubtedly will be if the ground work for the inauguration and conduct of such common-practice clubs is properly presented.

Memorial Day

The lessons of Memorial Day have also a practical business application for those who will but consider them, giving it a value additional to its prime intent. Primarily it is of course an appreciation of the sacrifice of those who fell in the fight for the Union—for the resulting privileges we now enjoy.

It is nice for the living to keep the grass green over the good and great and the flowers over our loved ones from wilting, but it should be remembered that memory is for the living and has no benefits for the dead.

The first opportunity following Memorial Day should be devoted to an accounting; a justification, excusing, or other mental corroboration of your attitude toward the living.

Are you taking the full measure of those who are doing for you now and so rewarding their service, remembering them, in a manner which shall benefit you both.

It was Robert Ingersoll who made the immortal statement that "Flowers on a coffin cast no fragrance backwards over life's pathway," and who then went on to say that he would prefer those who had alabaster boxes of precious ointment to break them for his anointing during lifetime and not to save them for the process of embalming the inert.

All of which is morbid or not, depending upon your own mental attitude.

And to make the argument of practical value in this work-a-day world.

It is better far to expend money on schools than upon prisons, and as far as foresight can, to make travel upon the highways of the sea safe, than to mourn, nation-wide, an Empress of Ireland or a Titanic loss, and so forth.

Safety First, in the shop and in all walks of life, is essential. The alabaster boxes broken for the anointing of his employees by Henry Ford shows the extreme application of this principle of considerateness for the living. and its mutuality. While the ultimate benefit of this practice is greatly to be questioned, the spirit which prompted it is worthy of commendation. He serves his fellowmen best who most rapidly increases the total wealth of society. Welfare work is not charity, but sound business, as is any means which creates harmony between capital and labor, the two supports of constructive production.

PERSONALS

ITEMS FOR THIS DEPARTMENT ARE SOLICITED FROM ALL READERS

H. L. Harkness, representing Hughson & Merton, has returned to San Francisco from Los Angeles.

J. O. Presbey, sales representative of the Holophane Works of General Electric Company, is at Salt Lake City.

L. Amigo, of the Cox Electric Company, Santa Cruz, Cal., has been spending a few days' vacation, combined with business, at San Francisco.

W. L. Huber, civil electrical engineer, has moved his office from the Foxcroft building to the First National Bank building, San Francisco.

Miles Steel, salesman with Benjamin Electric Manufacturing Company, has been elected a member of the Illuminating Engineering Society.

Geo. A. Gray, representative of the Crouse-Hinds Company, Chicago, Ill., has returned to San Francisco from a trip through Idaho, Nevada and Utah.

W. H. Heulings, Jr., general sales manager J. G. Brill Co., Philadelphia, who is traveling throughout California, arrived at San Francisco during the past week.

H. R. Noack, president of Pierson-Roeding Co., San Francisco, returned during the week from a several weeks' vacation trip through the high Sierra region.

A. L. Armstrong, associated with R. J. Davis, California sales agent of the Century Electric Company, St. Louis, is visiting the factory of the company, having started from San Francisco during the latter part of last week.

Howard Griswold, formerly assistant engineer for the San Francisco-Oakland Terminal Railway of Oakland, has been made mechanical and electrical engineer for the Central California Traction Company, with headquarters at Stockton.

R. E. Smith, representing the National X-Ray Reflector Company of Chicago, was the guest of honor at the dinner and meeting of the Engineers' and Architects' Association at the Hollenbeck Cafe, Los Angeles, on the evening of June 2nd, and spoke on "Indirect Lighting."

W. D. B. Dodson, secretary of the Oregon Hydroelectric Commission, gave an address before the sixth annual Commonwealth Conference held at the University of Oregon, May 27th, 28th and 29th on the work of the commission during the first twelve months of its existence.

L. E. Hanchett, who was appointed recently to the chairmanship of the board of the Northern Electric Railway to rehabilitate that concern, announces the appointment of **J. R. Wilson** as general freight and passenger agent of the road, succeeding **Samuel Russell**, who resigned.

H. W. Burkhart of Los Angeles, consulting engineer for the Central California Gas Company, was in Visalia, Cal., a few days since, in connection with plans for additions and improvements to the local service, mainly to increase the capacity of the local plant, which supplies gas to several Tulare county cities.

A. A. Isbell, superintendent of construction for the Marconi Wireless Telegraph Company with headquarters at San Francisco, is on his way to Alaska where he will have active charge of the construction of new stations at Cordova, Valdez, Juneau and Nome. **Jack Irwin**, manager of the company in the Pacific Northwest, is at Astoria, Ore., completing the work on the new high power station at that point.

S. R. Inch, general superintendent, and **W. R. Putnam**, commercial agent of the Utah Power & Light Company, and **C. A. Cohn**, superintendent of power stations of the Utah Light & Railway Company, together with **Carl Q. Cannon** of Salt Lake city, attended the convention of the N. E. L. A. at Philadelphia. While in the east Mr. Inch and Mr. Putnam will spend some time at the New York office of the Electric Bond & Share Company, which control the Utah Power & Light Company.

W. D. McDonald has been appointed district manager of the Seattle office of the Westinghouse Electric & Manufacturing Company, succeeding **F. N. Kollock Jr.**, who has resigned as previously reported, to accept the position of treasurer and assistant secretary of the Westinghouse Lamp Company at Bloomfield, N. J. Mr. McDonald was formerly branch manager of the Minneapolis office and has been succeeded there by **C. C. Curry**, who has been appointed acting branch manager.

OBITUARY.

Joseph Addison Sandford, aged 34, electrical engineer for R. Thomas & Sons Company, died at 10:25 a.m. May 21, 1914. He became suddenly ill of appendicitis while on a business trip in New York City a week ago, his condition assuming such a state that medical attention aboard the homeward bound train in the Philadelphia station was necessary. An operation was performed at the hospital by Drs. Hobbs, McCutcheon and Clyde Larkins. Peritonitis developed later, resulting fatally. His death came as a great shock to his relatives and friends. Since coming to East Liverpool four years ago from the New York offices of R. Thomas & Sons Company, he made many friends. He was a member of the Belmont and Kenilworth Country clubs and the Knights Templar. He was born in Ware, Massachusetts, October 17, 1879, a son of Mr. and Mrs. Joseph Addison Sandford. He was a graduate of Ware High School, the Wooster Military Academy and the Wooster Polytechnic Institute. He was also a post-graduate of the latter institute He was married in Ware, November 30, 1910. He was a member of St. Stephen's Episcopal Church. Besides his widow, he leaves one son, Addison Lawton Sandford. The body was taken to Ware, Mass., for burial.

MEETING NOTICES.

San Francisco Electrical Development and Jovian League.

In addition to business transacted by the Jovians at the last meeting an interesting talk was heard from H. W. Cope, assistant manager industrial and power department, Westinghouse Electric & Manufacturing Company, who is superintending the erection of the exhibit of his company at the P. P. I. E.

Portland Section A. I. E. E.

Upon the petition of the Portland section, and the approval of the sections and finance committees, the territory of that section was at the May meeting of the Board of Directors of the Institute extended to include the following: Corvallis, Eugene, The Dalles, Astoria, and Tillamook, Oregon, and Winlock, Washington.

The Jovian Electrical League of Southern California.

A highly interesting and varied program was provided for the entertainment of the Jovians who attended the weekly luncheon on May 27th, the same being presided over by H. F. Anderson. During the luncheon music was furnished by the Hawaiian Royal Entertainers, playing and singing their national airs with unbounded enthusiasm. As special guests of the league, about a dozen boys from the George Junior Republic were present. This institution, as is well known, was founded for the purpose of reclaiming boys who have made mistakes. After the coffee had been served the members were entertained for a half hour by the clever and versatile artist and caricaturist, "Rob" Wagner, who, with lightning rapidity, sketched the many ugly public buildings and statues in Los Angeles, including the lack of proper city planning ordinances and suggesting many ideas for civic betterment.

Utah Electric Club.

The regular weekly luncheon at the Commercial Club Thursday, May 28th, listened to an interesting talk on the

Mexican situation by Apostle Anthony W. Ivins of the Mormon Church, who has been in charge of the interests of the Mormon colonists in Mexico for a great many years, and who has been a resident of that country for forty years. Apostle Ivins spoke intimately of Diaz, Madero, Carranza, Villa and other Mexican leaders, all of whom he has known personally and with whom he has found it necessary in his official capacity to have many dealings. He outlined briefly the history of the country and causes which led up to the present conditions. The club adjourned their regular luncheons for the summer season.

CORONADO MEETING OF JOBBERS.

The regular quarterly meeting of the Pacific Coast Electrical Supply Jobbers' Association at Hotel del Coronado, San Diego, California, was the occasion of a representative gathering of electrical men on May 28, 29 and 30. In addition to the usual golf contests for which these meetings have become famous, a novelty was introduced in the way of a most successful Jovian rejuvenation.

The chief business transacted was a discussion and indorsement of the Stevens bill, allowing the manufacturer to fix the resale price, and a discussion of ways and means of combating the proposed eight-hour legislation in California.

The main party reached Coronado Thursday afternoon in time for lunch. The afternoon was devoted to golf practice, swimming, boating and automobile parties, visiting the beautiful and historic environs of San Diego. The California-Panama Exposition site was of particular interest to many of the visitors. A pool tournament was started in the evening, with informal card games and bowling contests for those so inclined.

Friday morning witnessed the golf contest among the jobbers for the Everready, Coronado and Contractors' cups. As can be noted from the tabulation of scores, H. V. Carter won the Everready and Coronado cups, keeping both of them permanently, as this made the third time that he had earned the right to have his name engraved on the Everready cup and the other was presented by the hotel management. The peculiar condition of the competition for the Contractors' cup granted it to C. B. Hall as the one whose gross score was 18 points worse than the best gross score made.

Jovian Rejuvenation.

Friday evening a magnificent rejuvenation of the Jovian Order was conducted under the joint auspices of Statesmen Alfred May of San Diego and J. N. Colkitt of Los Angeles. Twenty-three unrejuvenated satellites, among whom were some of San Diego's most prominent electrical men, were given a most impressive rendition of the Jovian ritual by the crack degree team from Los Angeles. Too much credit cannot be given for the spirit of co-operation thus engendered between the electrical men of these two southern cities, particularly to the self-sacrifices made by Statesman Colkitt and his degree team.

A sumptuous dinner at the Hotel del Coronado preceded the rejuvenation, over sixty Jovians sitting down to the tables. Carl H. Heilbron, president and general manager of the Southern Electrical Company, presided in his usual able manner as toastmaster. Responses were made by H. V. Carter, R. D. Holabird, F. H. Leggett, W. L. Goodwin, H. C. Ayres, A. H. Halloran, J. N. Colkitt and A. H. Elliott. John J. Portley favored the crowd with some beautiful songs which were greatly appreciated.

After the dinner the degree team took the candidates in charge and saw to it that each neophyte emerged as a fully rejuvenated being. The personnel of the team was as follows:

Jupiter, J. G. Pomeroy
Neptune, R. B. Clapp
Vulcan, L. E. Darrow
Pluto, T. E. Burger
Mars, A. L. Spring
Apollo, H. B. Hall
Hercules, K. E. Van Kuran
Avrenim, C. H. Carter
Mercury, C. L. Lamoree
Imps: B. F. Kieruliff, W. H. Lane, H. C. McCutchan, W. A. McNally.

With but three exceptions all the members of this team traveled the 250 miles from San Diego to Los Angeles and return for the sole purpose of taking part in the rejuvenation. To their enthusiasm and co-operation a large part of the success of the rejuvenation may be ascribed.

Following is a list of the candidates who are residents of San Diego unless otherwise noted:

H. C. Ayres, president Ayres Electric Company.
J. P. Boring, Orange, Cal.
R. A. Bartling, Hartwell Electric Co.
H. H. Barter, elec. engineer, Panama-California Exposition.
C. J. Brown, representative Electrical Workers Organization.
R. C. Cavell, draughtsman, San Diego Cons. G. & E. Co.
D. M. Crist, assistant city electrical engineer.
L. B. Collins, Collins Electric Company, Coronado.
W. W. Cott, Edison Lamp Works of G. E. Co., Los Angeles.
G. F. Cunningham, Cunningham Electric Company.
F. S. Hartwell, manager Hartwell Electric Company.
S. L. Hall, purchasing agent, Southern Electric Company.
W. H. Kaemper, Independent Electric Company.
L. M. Klauber, elec. engineer, San Diego Cons. G. & E. Co.
C. C. May, purchasing agent, San Diego Cons. G. & E. Co.
R. P. Moses, Moses Electrical Company.
Thurston Owens, manager, San Diego G. & E. Appliance Co.
John J. Portley, representative F. F. Foster Co.
R. L. St. John, Bay City Equipment Company.
Frank A. Sinks, Electrical Equipment Company.
E. C. Schaffer, Schaffer Electric Company.
H. B. Steventon, assistant manager, Electric Equipment Co.
J. F. Zwiener, Hartwell Electric Company.

Golf Contests.

Saturday morning the manufacturers played for the cup presented by the jobbers, R. B. Clapp winning the coveted honor. The jobbers also competed for the Patton and the copper cup. R. D. Holabird, member of the committee, getting low score and permanent possession of the former. Meanwhile the ladies putted, Mrs. C. H. Carter winning the silver cheese dish.

The pool tournament was won by H. B. Hyde.

Jobbers.

	Everready. Gross.	Contractors. Net.	Jobbers. Gross.	Patton. Net.
Berry	113	103	109	114
Burger	104	104	103	102
Carter, H. V.	95	**100**	102	108
Carter, C. H.	...	...	104	106
Graham	122	110	144	132
Goodwin	98	103	91	96
Hillis	102	111	92	100
Holabird	93	102	83	**91**
Hall, C. B.	**111**	101	124	114
Leggett	103	108	95	99
Taylor	139	121	124	106

Manufacturers.

	Gross.	Net.
Gregory	100	95
Van Kuran	107	102
Clapp	89	**92**
Lauritzen	105	111
Oakes	113	103
Poss	119	107
Hall, H. B.	117	105
Cott	126	108
Halloran	147	129
Mathews	103	103
Murray	113	103
Colkitt	131	113

The festivities were brought to a close with the golf dinner on Saturday night when the cups were presented to the winners. T. E. Burger presided at the table as toastmaster. These speakers included H. V. Carter, H. T. Matthews, R. D. Holabird, A. H. Halloran, R. B. Clapp and A. H. Elliott. Those seated at the table were:

Airey, Mr. and Mrs. F. J.
Berry, Mr. and Mrs. W. S.
Boring, Geo. A.
Burger, Mr. and Mrs. T. E.
Case, J. O.
Carter, Mr. and Mrs. C. H.
Carter, H. V.
Colkitt, Mr. and Mrs. J. N.
Cott, W. W.
Elliott, A. H.
Gilson, Ross
Goodwin, W. L.
Graham, N. W.
Gregory, S. B.
Hall, Mr. and Mrs. C. B.
Hall, H. B.
Halloran, A. H.
Harris, D. E.
Hillis, C. C.
Holabird, R. D.
Hyde, P. B.
Lamoree, C. D.
Lane, W. H.
Laurtizen, Hal.
Leggett, Mr. and Mrs. F. H.
Mason, Mr. and Mrs. C. T.
McCutchan, H. C.
Matthews, Mr. and Mrs. H. T.
Montgomery, Mr. and Mrs.
Murray, F. H.
Norton, E. A.
Oakes, Mr. and Mrs. R. F.
Owen, Miss
Poss, Mr. and Mrs. Fred.
Quinn, F. J.
Rawls, R. B.
Reed, P. C.
Reynolds, Duncan
Spring, A. L.
Taylor, Sam'l.
Van Kuren, Mr. and Mrs. K. E.
Wiggin, C. E.
Young, Carl

CALIFORNIA ASSOCIATION OF ELECTRICAL INSPECTORS

Section of N. A. E. I.

C. W. Mitchell, President. Arthur Kempston.
Wm. G. Pennycook, Vice-Pres. B. C. Hill, Executive Comm.
John W. Carrell Secretary-Treasurer, 55 Fulton, San Francisco.

The purpose of this organization is to standardize the common practice in electrical construction with the National Code as the general standard.

Questions pertaining to electrical construction will be answered in these columns, but only from the point of view of the Code. This is a voluntary organization and the answers published under this heading must not be construed as authoritative, or binding. No attempt will be made to correllate the answer from the several Inspection Districts, as an occasional difference of opinion will tend to induce further study on subjects. All questions will be passed upon by an executive committee.

Address all communications to the secretary.

By the Secretary.

Practical men demand practical results. They are beginning to demand such results from the C. A. E. I. Many suggestions have been made along the general lines that a common practice club be organized in each inspection district having for its object to secure a better and more uniform standard of electrical construction and to promote uniform interpretation and enforcement of the rules which comprise the standard, and that the C. A. E. I. correlate the results of the several clubs.

The C. A. E. I. organized for the purpose of standardizing the common practice, based on the N. E. Code, invites all practical men to aid in any practical way which appeals to them. The association can be relied upon to perform its part, and will in all matters adopt the most highly developed, most clearly set forth opinion or schedule from whatever source. Action along these lines is suggested.

Questions and Answers.

Question 1 (a)—Under what N. E. Code rule can the use of rosettes be required to attach pendant cords to a system of wiring? (b) What rule prohibits the attaching of more than one cord to the same rosette? (c) What rule prohibits the decoration of pendant cord with tissue paper and gauze?

Ans. 1.—No rule requires the use of rosettes but 32 (g) mentions same. However, strain of cord must be off wires. There is nothing mandatory in the Code to prohibit more than one flexible cord from being attached to the same rosette or to prevent decoration of cords but consider both conditions hazardous and would not allow same.

Ans. 2.—The Code does not require a rosette but does require substantial support for the cord; does not by actual words, but does by inference and intention, prohibit both the last named conditions.

Ans. 3.—There is no N. E. Code rule making it mandatory to use rosettes. By inference only do the rules indicate that rosettes should be used. See Rules 32 and 71. There is no Code rule prohibiting more than one cord from being attached to the same rosette and none prohibiting the decoration of cord with paper and gauze.

Ans. 4.—I consider Rule 32 to plainly imply that rosettes or some similar method of attaching cords must be used, also that the attaching of more than one cord to the same rosette and that the decorating of cords with tissue paper, etc., is a hazard which rule 32 is intended to prevent.

Ans. 5.—Nothing mandatory concerning the use of rosettes. 71 (e) would be one rule to prohibit the attaching of more than one cord to the same rosette as it would be impossible to tie two knots in the same one. No rule prohibits use of decorations on pendant cords but intention to prohibit same is plain.

Ans 6.—1 (a) No. 1 (b) Yes. 2 (b) Yes. Not by actual statement but by inference.

Ques. 2.—Under Rule 26 (o) does No. 0000 have to be supported every 60 ft. or every 80 ft.

Ans. 1, 2, 3, 4, 5 and 6.—Every 60 ft.

Ques. 3.—Rule 23 (f), paragraph No. 2: " For circuits having a maximum capacity greater than that for which enclosed fuses are approved, circuit breakers alone will be approved." Does the word "alone" mean "only?"

Ans. 1, 3 and 6.—Yes.

Ans. 2.—Yes. The rule means circuit breakers only will be approved; but since the publishing of the 1913 Code the Underwriters' Council has made provision for the banking of fuses.

Ans. 4.—The rule evidently means circuit breakers only if on circuits where fuses are not approved.

Ans. 4.—Yes, if on circuits where fuses are not approved.

Ans. 5.—Rule 23 (f) paragraph 2, meets a condition for which fuses large enough are not manufactured and for which circuit breakers "only" will be approved. Also see Rule 67 (c), paragraph 2.

NEW CATALOGUES.

Pressed Steel Case Transformers are fully described and illustrated in Bulletin No. 1280 issued by the Pittsburg Transformer Company, Pittsburg, Pa.

The Wagner Electric Manufacturing Company has published an edition of their Manual of Electrical Testing in miniature form. The Bulletin is No. 104, measures 3½x5 in. and contains all the information in the large size bulletin.

The Ohio Brass Company has issued a splendid cloth bound catalogue, No. 14 of 1914, containing more than six hundred printed pages illustrating and detailing their lines of Electric Railway and Mine Haulage Materials, High Tension Insulators and Supplies. In addition to catalogue information it contains much technical data of interest in connection with the installation and use of these materials.

TRADE NOTES.

E. S. Knight Electric Company of Portland, Ore., has obtained the electrical contract for the Bishop Scott School, Yamhill, Oregon.

The American Electric Company has obtained the contract for the electrical installation in the Brown Apartment House, located on the southwest corner of Yamhill and Lawnsdale streets, Portland, Oregon.

The Hammond Lumber Company has purchased the following Crocker-Wheeler Company's motors for use in its lumber mill at Mills City, Oregon, from D. D. Poppleton, Portland, Oregon. The motor equipment is as follows:

Squirrel Cage Type.

1—50 h.p., 440 volt, 3-phase, connected to edger.
1—10 h.p., 440 volt, 3-phase, connected to stacker.
1— 3 h.p., 440 volt, 3-phase, connected to unstacker.
1—7½ h.p., 440 volt, 3-phase, connected to transfer chains.

Slip Ring Type.

2—10 h.p., 440 volt, 3-phase, connected to rolls.
1—7½ h.p., 440 volt, 3-phase, connected to rolls.

There will also be installed a mono rail and transfer cranes for handling lumber in this mill. This part of the system will operate on a d.c. 250 volt system. Power is derived from water power at the plant.

Bids for the Fresno, Cal., electrolier street lighting system were opened on Monday, June 1st, NePage, McKenny Company being the lowest bidders. The various bids were as follows:

	Pressed Copper.	Pressed Steel.	Cast Iron.
Turner Company	$67,964	$63,312	$63,165
Woodhill-Hulse	63,000	57,000	56,000
H. S. Tittle	.....	.....	57,360
Power Equipt.	71,500	64,800	62,800
Pacific Fire Ext. Co.	55,462	49,613	53,114
Newbery-Bendheim	57,000	51,412	54,500
California Elec. Co.	54,500	47,900	49,300
NePage-McKenny	49,700	44,200	45,600

The equipment calls for the installation of 487 electroliers and necessary conduits. The question as to which type of standard will be adopted was taken under advisement.

NEWS NOTES

INCORPORATIONS.

BURNS, ORE.—Articles of incorporation have been drawn for the Harney Hydroelectric Company with a capital stock of $250,000. The company is organized for the purpose of taking over the J. Edwin Johnson holdings in the power site filed on the North Fork of the Malheur River about 20 miles north of Drowsey. The principal office will be in Burns.

FINANCIAL.

SAN FRANCISCO, CAL.—Combined earnings of the Great Western Power Company, the California Electric Generating Company and the City Electric Company for April, 1914, show a loss of $4275 in gross and $4299 in balance after guaranteed dividends, compared with April last year. This is due to the fact that the contract by which the Great Western Power supplied 5000 horsepower energy to the Pacific Gas & Electric Company, amounting to about $20,000 a month, has expired and revenue is no longer being received from this source. The April statement shows that the Great Western Power has already overcome three-fourths of this loss, and it is stated that by the end of July all of it will have been overcome and monthly reports will again be showing increases over the corresponding months of 1913.

ILLUMINATION.

TILLAMOOK, ORE.—The Tillamook Electric Light & Fuel Company has been granted a franchise to construct electric lines in this city.

BOISE, IDAHO.—The Idaho Power & Light Company has been awarded the contract for supplying current to the new arc street lighting system.

RAYMOND, WASH.—The county commissioners have granted to W. P. Cressy a franchise to use the roads between South Bend and Raymond for gas mains.

NEHALEM, ORE.—An election has been called for July 15th, for the purpose of voting bonds for the purchase of a water system and the construction of a municipal electric light plant.

CENTRALIA, WASH.—The Vader Gas & Fuel Company, a new corporation, has been granted a 15 year franchise by the Vader council to operate a plant in the town, for furnishing gas for illuminating purposes.

AUMSVILLE, ORE.—At the special election on the electric light franchise the measure carried. The Aumsville Flour Mills will begin construction work in a few days. The city will install about 30 street lights.

SAN FRANCISCO, CAL.—A contract has been entered into by the Pacific Gas & Electric Company with the Schaw-Batcher Company Pipe Works for two improved Jones oil gas sets, two primary scrubbers and three secondary scrubbers at Potrero gas works on W. Delaware street, for $41,183.

COVINA, CAL.—The contract for the installation of metal lighting posts and appurtenances for lighting Badillo avenue, fram Baranca to Hollenbeck streets and portions of citrus avenue and Navilla place have been awarded to the Newberry-Bendheim Electric Company, for $11,948, complete.

PORTLAND, ORE.—The Northwestern Electric Company is erecting large steel arches at every corner from Yamhill to Burnside street, on Third. The arches are to be illuminated in an artistic manner. These arches rest on four concrete footings, one on each of the four street corners, and the four arches are curved gracefully to a common point in the middle of the intersection of the streets. The arches being sufficiently high to clear all traffic, including the street cars and trolley system. The property owners along the street pay a monthly rental for the arches, which covers maintenance and lighting.

SAN DIEGO, CAL.—Under a decision rendered by Judge C. N. Andrews in the superior court, damages cannot be collected from an electric light corporation which turns off light or power for the non-payment of bills. The decision was made in the suit of George E. Kerns of the Casino Amusement Company against the San Diego Consolidated Gas & Electric Company. Kerns operates a moving picture theatre on Fifth street and brought suit in the justice court early this year for damages because the electric light company had turned off his power on December 19th, leaving him without light. This act, he claimed, injured his business. Justice of the Peace Solon Bryan gave Kerns a judgment for $50. Judge Andrews reversed the decision on the ground that the corporation had the right under contract to turn off the power if bills were not paid.

SAN FRANCISCO, CAL.—The Pacific Gas & Electric Company was made defendant in a suit for $139,934 when the Security Investment Company filed an action against the former corporation to recover that amount for alleged damages to the investment company's building. The Pacific Gas & Electric and the Security Investment Companies occupy adjoining buildings on the north line of Sacramento street, between Montgomery and Sansome. The company has a power plant there and the investment concern an office building. It is said by the plaintiff corporation that the vibrations of the machinery in the power plant have damaged the investment company's structure to the amount mentioned in the complaint. The complaint recites that the gas company has threatened to excavate with a view of enlarging its plant, so an additional $25,000 damages is asked if the defendant makes such a move. The plaintiff wants a perpetual injunction to restrain the gas company from constructing a larger plant.

SALT LAKE CITY, UTAH.—City Attorney Harper J. Dinniny made a report to the city commission last week declaring that the special lighting improvement law passed by the state legislature of 1913 permitting cities to create special lighting districts and assess the cost of installing and maintaining special street lighting against property owners is impractical, if not impossible in its provisions, in which he pointed out numerous defects. He reports that it is not in line with other state laws referring to public improvements, and recommends that no action be taken to make the provisions of this law effective in Salt Lake until it can be amended so as to harmonize it with the present statutes pertaining to special assessments. The law was passed by the legislature to give property owners in the business district and in residential districts an opportunity to improve them by installing special ornamental lighting, and to divide the cost of these installations equitably between the various property owners benefited. Several of the city's most progressive business men who were instrumental in having the 1913 law passed are arranging to have such amendments made at the next session of the legislature as will be necessary to make the law effective.

TRANSMISSION.

GOLDENDALE, WASH.—The Pacific Power & Gas Company has been granted a franchise to construct electric transmission lines upon the public roads in Klickitat county.

MORGAN, UTAH.—The power plant owned by the Como Light & Power Company, located near the narrows in Hard Scrabble Canyon, has been purchased by the Utah Power & Light Company, with headquarters in Salt Lake City.

SAN BERNARDINO, CAL.—The board of supervisors of San Bernardino county have granted the Southern California Edison Company a franchise to construct and operate an electric distributing and transmission system under and along certain public highways in that county.

PHOENIX, ARIZ.—Surveys for a line of the Falls Power & Electric Company are being made, and work will begin soon. The system will comprise eight miles of main lines at 4000 volts, 17 miles of secondary lines at 2200 volts, and a local service will be operated both for light and power at 110 volts.

TUCSON, ARIZ.—The transmission line of the Tucson Gas, Electric Light & Power Company, which has just been extended to Sauharita ranch, a distance of 10 miles, is to be further extended to Rillite Valley. Estimates for the work on the power plant and power plant machinery to be installed call for an expenditure of about $90,000.

SEATTLE, WASH.—With a view of establishing a central power plant on the Little Busttna River along the line of the proposed Alaska railroad, the Stone & Webster Engineering Corporation has dispatched a man to make investigations. The plant will furnish power for small quartz mines. The construction of the plant will cost about $200,000.

MARENGO, WASH.—The Pacific Power & Light Company is building a new transmission line from Dayton to Marengo. This line is 18 miles long and operates at 66,000 volts. It is a 3-phase system, using No. 4 stranded iron on combination suspension and pin type insulators. At Dayton there will be located one 200 kw. 6600-66,000 volt transformer, and a 150 k.v.a. transformer at Marengo, 66,000-6600 volt.

YREKA, CAL.—The California-Oregon Power Company is constructing extensions of its lines in the country south of Montague for a distance of 20 miles. The work is to be continued on to Weed before completed. The section now under construction is to be completed by July, and its chief purpose is to supply power for irrigation pumps on the many farms that are being developed in the district. The present extension is from the pumping station of the Montague Land & Irrigation Company down past Granada. The farmers will drill wells and install electric pumps. Noel E. Graves is the engineer supervising the power line work. He states that the water level in the ground is high, making a small lift for the pumps and small cost for placing the water on the land.

PORTLAND, ORE.—Preparatory to the establishment of a municipal lighting plant in Portland to furnish light and power for all the city streets, buildings, shops and parks and possibly to enter into the sale of current for commercial purposes, City Commissioner Daly will ask the city council to uphold him in the appointment of an electrical engineer to make a detailed investigation of the cost and feasibility of such a plant on one of two power sites under consideration. Both of the sites belong to the city. Under budget appropriations, the city has about $5000 available for the investigation. It is proposed to engage a competent engineer to make surveys, soundings and an estimate of the cost of plants on both the sites. One site has a capacity under proper development of 10,000 h.p. and the other has a capacity of 30,000 h.p. As the city uses only about 3100 h.p. the plan opens the way for the city to enter into the commercial power field. At present, under a contract with the Portland Railway, Light & Power Company, the city's light and power bill amounts to about $200,000 a year. The contract for the service at this rate extends for 2½ years yet.

TWIN FALLS, IDAHO.—The Public Utilities Commission of this state will hold special meetings at Buhl and Twin Falls during the week commencing May 25th to consider the application of the Clear Lake Power & Development Company for a certificate of convenience and necessity for entering what is known as the greater Twin Falls country with an electric power distributing system in competition with the Great Shoshone & Twin Falls Water Power Company. At the same time a hearing will be given the Great Shoshone & Twin Falls Water Power Company and the Idaho Power & Light Company which have been in controversy for some time over the control of the southern Idaho territory. The city council of Twin Falls at a meeting last week passed a resolution petitioning the public utilities commission to give favorable consideration to the application of the Idaho Power & Light Company and the Clear Lake Power & Development Company for a franchise to enter this territory, the council wishing thereby to throw open the territory to all of the companies wishing to enter the Twin Falls section. The Great Shoshone & Twin Falls Water Power Company as first on the ground, is making a strong fight to hold the territory against other companies.

SALT LAKE CITY, UTAH.—A three cornered contract has been entered into between the state of Utah, the Utah Power & Light Company, and the Utah Light & Railway Company for the transmission of electric power from the state plant in Logan Canyon to all the state institutions. The state built a power plant in Logan Canyon three years ago intending to supply all of the various state institutions from this plant, but up until the present time a satisfactory arrangement for the transmission of this power has not been arrived at. Under the terms of the present contract, the Utah Power & Light Company transmits the power from the state power plant in Logan Canyon to Salt Lake City, Ogden and Provo over its high tension transmission lines. At Salt Lake City and Ogden the current is turned over to the Utah Light & Railway Company who transmit it over its distribution system to the state capitol, building, university, penitentiary, the industrial school and the school for the deaf and blind. At Provo the Utah Power & Light Company transmit it over their secondary distribution to the state mental hospital. The state power plant furnishes in addition to the current consumed by these various institutions, sufficient power to compensate the transmitting companies for the loss in their system, and the state pays to them as compensation for this transmission service at the rate of 1½c per kw.-hr. for all energy delivered. Governor Spry declares that the contract is a highly advantageous one to the state.

TRANSPORTATION.

OGDEN, UTAH.—Authority for the immediate building of the Huntsville line of the Ogden Rapid Transit Company extending from Hermitage through Ogden River Valley, has been given by the board of directors.

OAKLAND, CAL.—With the explanation that the present name is too cumbersome, the San Francisco-Oakland Terminal Railways Company has petitioned the superior court for permission to change its name to the California Railways.

SAN FRANCISCO, CAL.—In line with a statement made by Jesse W. Lilienthal, president of the United Railroads, that he stands ready to consider a proposition from the city authorities looking toward the taking over of the United lines by the city prior to the expiration of the franchises. Mayor Rolph has announced that he is ready to appoint a committee at any time to confer with the company on the matter.

SAN FRANCISCO, CAL.—The board of works has called for bids for electrical conductors for the municipal railway to be opened June 10th. The cost is estimated at $39,000. The bids will cover the furnishing and installation of all overhead trolley wire, underground feeder cables and appurtenances for the Van Ness avenue, Potrero avenue, Chestnut street, Fort Mason, Stockton street, Columbus avenue and California street lines.